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[ORIGINAL COMMUNICATION.]

PHOTOGRAPHY AS APPLIED TO THE STUDY OF BOTANY.

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PROCESS OF MAKING PHOTOGRAPHS.

(Continued from page 102.)

SUCH apparatus as was described in the preceding article is, of course, designed for photographing by the dry-plate process.

The dry plates in common use are plates of glass, coated on the side designed to be exposed to light in the camera, with a thin layer of gelatin impregnated with certain salts of silver. They are manufactured in various sizes, and are put up in packages of one dozen each, securely protected from light.

We will now suppose the student provided with all necessary apparatus, including a package of dry plates, and that he is desirous of making his first attempt at photographing.

First of all, one or two plates must be transferred from the box in which they are packed, into the plate-holder, and as this must be done by ruby light—the least ray of white light ruining the plate—a dark-room must be provided.

Any small room or closet will do, but care must be taken that it is absolutely light tight. Key-holes, cracks, and crevices must be stopped so that not a suspicion of light can enter. If the room have a window, this can be covered with two or three thicknesses of red paper, and thus rendered safe.

FIG. 15.—Dust brush.

Should the student have no such room at his disposal, he can fill the plate-holder at night in almost any room, taking care, of course, to exclude all white light by closing the shutters and drawing the shades.

In handling the plates, avoid touching the side coated with gelatin with the fingers, but brush it carefully with the flat brush figured above (Fig. 15), and place it in the holder with this side outward. It is a good plan also to dust the holder before inserting plates, since every particle of dust which by any chance rests upon the gelatinized surface of the plate at the instant of exposure will cause an imperfection in the finished negative.

Having filled the holder, secure the remaining plates of the package against exposure to light before opening the door of the dark-room, else you will repeat my own experience and use plates thoughtlessly spoiled by neglecting this precaution.

Having chosen the object to be photographed, see that it is in a good light. If the operation is conducted out-of-doors, there is generally little difficulty, for if the illumination be unsatisfactory at one hour of the day, at another it may be all that is desired.

As a rule the camera should not be pointed toward the direction from which the light emanates but the reverse, or, better still, in such a manner as to have the light on one side of the object. Arranged in this way the shadows will act to the best advantage in giving the necessary relief to the object.

See that the camera is as nearly level as possible, having due regard to the shape of the object, and that the lens is is about opposite the central point of interest, for this will insure the proper placing of the picture on the plate, and prevent distortion where it is most to be dreaded.

Now remove the cap from the lens, throw the focussing-cloth over your head and the back part of the camera in order to shut out the light as much as possible, and thus enable you to see distinctly the image upon the ground-glass. Then, with the finger upon the binding-screw, draw out the back part of the camera until the image of the object is sharply focussed on the glass. This will bother you some at first, partly because you see everything in a reversed position, but a little practice will overcome the difficulty. A small magnifying glass, such as is used in botanical analyses, is a very convenient aid in determining the sharpness of focus, for with it you can go over the ground-glass in detail, examining features too minute to be seen distinctly with the unassisted eye.

You must remember, however, that all parts of the object cannot be exactly in focus at the same time, hence you should focus upon the point of greatest interest, being assured that the less important features will be near enough the focus for all practical purposes.

Having finished your examination of the ground-glass, tighten the binding-screw, recap the lens, remove the ground-glass frame, and insert the plate-holder. Then draw out the slide in front of the plate, being careful to do so with as little jarring of the tripod as possible, remove the cap from the lens, count the number of seconds you have decided upon as a proper exposure, recap the lens, insert the slide in the plate-holder, and your are ready for the next step in the process of picture-making.

Remember always that everything depends upon the

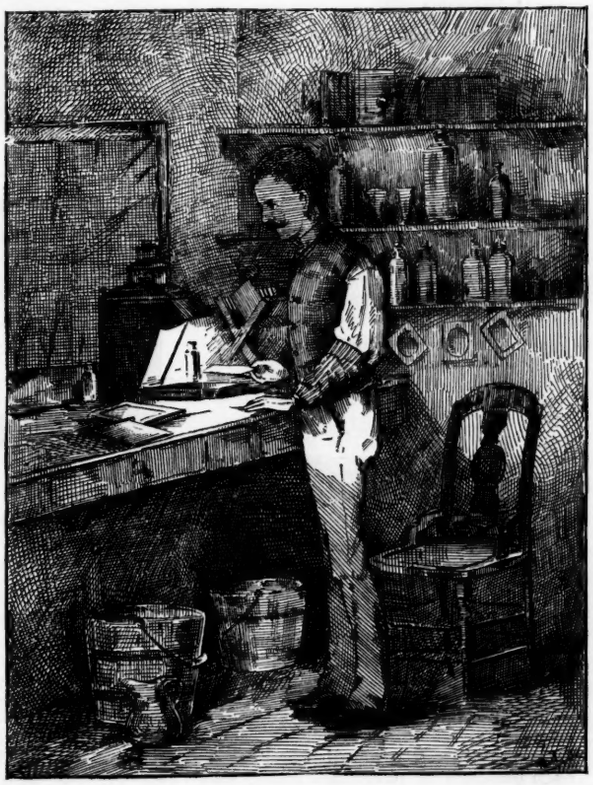


FIG. 16.—Developing a plate in the dark room.

care with which you make the exposure, hence do nothing hurriedly, but consider well every movement before executing it. I have myself frequently made miserable failures through unnecessary excitement in such ridiculous ways as by forgetting to uncap the lens after drawing the slide, thus not exposing the plate at all, or by drawing the wrong slide and thus spoiling a plate altogether. Another point worth remembering is, immediately after exposing a plate and pushing in the slide, make a memorandum of the exposure on the front silicated surface of the slide, else you will be quite likely to forget which plate in a double plate-holder has been exposed, and will only discover it when you develop the plates, and find one of them bearing the confused outlines of two pictures, while the other remains blank.

Regarding the duration of time required for a proper exposure, it may be said at once that there is no definite rule. Different lenses require different exposures, as do also different plates, so that the student must experiment for himself.

At first it is safest to use slow-acting plates, whatever lens may be employed. Again, very much depends upon the light. If the operation be conducted in bright sunlight, the exposure would manifestly be much shorter than if done under a cloudy sky, and much shorter too in the middle of the day than towards evening, when the light is much less intense; much shorter also when the lens is used with a full aperture than when a small diaphragm is employed; and, finally, the duration of exposure is much shorter out of doors than in a room with a side light.

I repeat, then, that the student must experiment for himself; but in the absence of some standard, how shall he be able to experiment intelligently? The answer to this question will appear in the description of the next step.

DEVELOPMENT OF THE PLATE.

Let the first plate be exposed in a good light, say, five seconds, and when it is developed we shall be able to determine any errors in the duration of exposure, and hence will know how to prevent future ones.

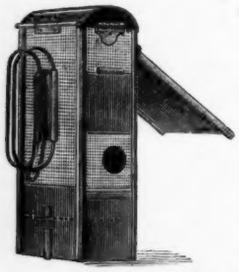


FIG. 17.—Small developing lantern.

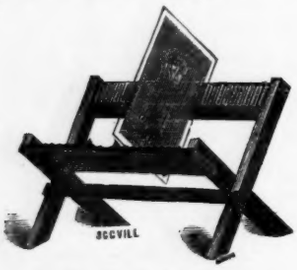


FIG. 18.—Drying rack.

FIG. 19.—Developing pan.

The exposure of a gelatin plate to light in the camera makes no sensible change in its appearance; the picture is only rendered visible through the agency of certain chemicals, whose mode of application will next be described.

Manufacturers generally send with each package of plates a formula for the preparation of developing solutions to be used with them, and commonly also specific directions for their application. However much these solutions may differ from each other in matters of detail, they may be readily divided into two classes; namely, those employing pyrogallic acid as their most essential ingredient—"pyro developers"—and those which use iron instead of pyrogallic acid—"iron developers."

As the former are at present employed almost universally, we will make use of one in our first experiment.

Dissolve ½ ounce of pyrogallic acid in 4 ounces of alcohol; label the bottle No. 1.

Dissolve 70 grains of bromide of ammonium in 6 ounces of water and add one ounce each of glycerin and of stronger water of ammonia; label this No. 2.

Dissolve 1 ounce of bromide of ammonium in 4 ounces of water; label this No. 3.

I copied this from the formula accompanying a package of plates, and, from considerable experience, can confidently recommend it. In well stoppered bottles, the solutions keep without change for a long time.

In addition to the above, there are required also a solution of hyposulphite of soda—one part of the salt in four of water is about right—and a saturated solution of alum.

With these solutions at hand in the dark-room, together with a pitcher of water and a vessel for slops, we are ready to light the ruby lantern, close the door and develop the plate.

To eight ounces of water add two drachms each of No. 1 and No. 2, and mix by gentle agitation. Pour half of it into one of the developing pans, which for surety should be marked A, and the remainder into another pan marked B, and to the latter add fifteen minims of No. 3.

Now take the exposed plate from the holder, and lay it by a careful but quick movement into pan A, in such a manner that the solution may flow

FIG. 20.—Positive.

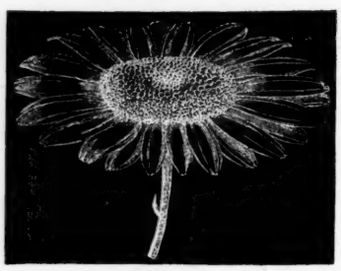


FIG. 21.—Negative.

rapidly over its upper (exposed) surface, detaching any air-bubbles with the finger or by rocking the pan from side to side. After the lapse of a few seconds, or possibly a minute or two, during which you gently rock the pan from side to side, so as to keep the solution slowly moving, you will observe that the gelatin begins to lose its whiteness here and there. Very soon the dark spots begin to assume definite forms, and then you can distinguish many of the details of your picture. You will note also that these details are the reverse of natural. If, for instance, the view have a bit of sky in it, this shows black, while the places of shadows in trees standing in the foreground are occupied by broad patches of unchanged white gelatin. But supposing these changes have taken place too rapidly for accurate observation, in other words, that the details of the picture have appeared very quickly, flashing as it were over the plate; lift the plate instantly out of pan A and place it in B, by which means the rapid action will be changed to a slow and gradual one. The details already present will become more distinct, and others still will slowly appear. After a time, however, all detail seems about to disappear; the whole plate grows gray, and the picture sinks away, so that you can scarcely distinguish anything. Now lift the plate out of the pan, and hold it up toward the lantern, and you will see the picture in all its details, ready for the next step. Wash it in plain water, lay it in a pan marked *Hypo*, and cover it with the solution of hyposulphite of soda. Here it must remain a few minutes to dissolve out all the unchanged silver in the gelatin; this is called *fixing* the plate. You can tell when the fixing is completed by examining the back of the plate. When first placed in the solution, this (the back) is milky white but this appearance is gradually lost, and in a few minutes it becomes perfectly clear. Then remove it from the hyposulphite, and without rinsing, immerse it for a minute or two in the alum solution; this hardens the film, and prevents injury during the washing, which the plate is next subjected to, after which it should be placed on edge in the negative rack to dry. If the washing be done in running water, only a few minutes are required, but if this is impracticable, soak it for half an hour or so with frequent changes of the water. All the hyposulphite must be washed out of the film, else it will ruin the negative.

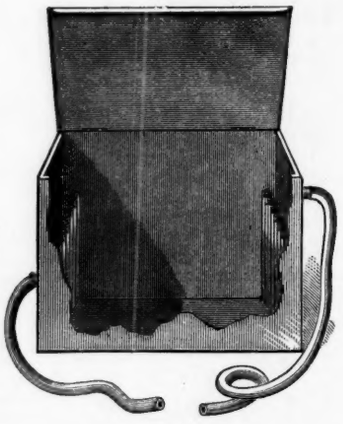


FIG. 22.—Washing box.

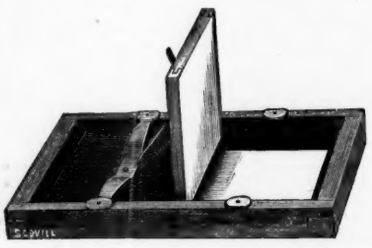


FIG. 23.—Printing frame.

The two pans of developing solution used in this process, as the reader has doubtless observed, are prepared in order to have the operator armed against the effects of over-exposure. The plate is placed in pan A, and if the image appears too quickly, it is transferred to B, which contains more bromide of ammonium, and exerts a restraining influence.

Now, if a plate is suspected of over-exposure, the plan of procedure may be reversed by placing it at once in B, and then if the details appear too slowly, it can be removed to A. If, when placed in B, the picture appears still too quickly, more of No. 3—say five or ten drops—may be added. The terms "too slowly" and "too quickly" are of somewhat arbitrary significance, but their relative meanings can be acquired by a little experience.

Though I have used at one time or another several other pyro developers, I have as yet found none quite as satisfactory as this. It is equally applicable to instantaneous exposures and to those of prolonged duration.

Regarding iron developers, I shall say nothing, save only that I have

discarded them entirely, satisfied that pyro is much preferable.

As already indicated, the rapidity or slowness with which the picture appears when the plate is in the developing solution, decides sufficiently well whether it has been exposed too long or not. If the time has been excessively long, in spite of the restraining influence of the solution in pan B, the plate quickly darkens all over, the details being merged into a cloud which overspreads everything. In this case, rinse it quickly, and place it in the hypo at once, though it is hardly worth the trouble, for 'tis spoiled, and you must try again. On the other hand, if the image appears very slowly indeed in pan A, the details coming out but imperfectly, you will find the finished negative presenting strong contrasts of light and shadow, but an almost total absence of half-tints, upon which often the beauty of the picture greatly depends. Such a plate has not received sufficient exposure.

In developing plates in hot weather, it is best to employ ice water to avoid what is termed frilling, that is, a softening and expansion of the gelatin film by which it is raised from the glass along the margins into little rolls or frills. Should this accident happen at any stage of the development, rinse the plate immediately, and immerse it in the alum solution for a minute or two, then wash it, and proceed with the development from the point at which you left off. The plates of some manufacturers are much more liable to frill than those of others, and on this account are less desirable, especially in hot weather. If you happen to get a package which shows this tendency, it will be safer to place the plate in the alum solution before fixing with hypo rather than afterwards, as is the ordinary way.

Finally, I feel that I cannot err in insisting upon the carefullest attention to every detail in the development of plates. By keeping separate pans for each individual solution, and for this alone, marking them accordingly, and by washing all utensils immediately after finishing your work with them, you will avoid serious difficulties, and be reasonably sure of satisfactory results.

Thus much for the development of the plate, which is now termed a *negative;* that is, a plate in which the lights and shadows are the reverse of those of the object toward which the camera was pointed. We have next to print a positive on paper in which the object shall appear with natural relations of light and shade. These relations are shown in the accompanying illustrations, Fig. 21 showing a negative, and Fig. 20 a positive.

PRINTING.

If you are content with half doing a thing, you may purchase paper for printing ready for use; if, on the other hand, you wish to get the best results attainable, at whatever pains-taking cost, you will purchase albumenized paper only, and sensitize it as you require. Sensitized paper, as furnished by manufacturers, does not keep well, and I could never get wholly satisfactory prints from it.

Albumenized paper occurs in sheets, 18 by 22 inches, and may be had of any dealer in photographic materials at small cost. It is prepared for use in the following manner:

Make a solution of nitrate of silver, fifty grains to the ounce, in distilled water; or, if this be inaccessible, water that has been boiled and filtered, will answer nearly or quite as well. Pour the solution into a flat glass, porcelain, or agate-ware tray of suitable size, in such quantity that the bottom may be covered to the depth of at least an eighth or a quarter of an inch. Now take the paper by opposite corners and lay its albumenized side lightly on the surface of the liquid, being careful to avoid imprisoning air-bubbles. If the edges tend to curl upward, blow against them softly. In a few seconds, carefully raise one corner after another, to see whether there are any bubbles; and if so, break them by blowing against them. Let the paper rest upon the solution a minute and a half, then raise it slowly by one corner, drawing it, as you do so, over a clean glass-rod held in the other hand, in order to clear off, as much as possible, the liquid adhering to its surface. Lay it now in a sheet of blotting-paper, folded through middle and kept for this purpose, and quickly press it all over, then hang it up to dry in a dark place. As soon as it is dry enough, say in fifteen minutes, put it in a close box containing a saucer, into which you have poured two or three drachms of strong aqua ammoniæ. Leave it there fifteen or twenty minutes, and it will be ready for use.

As you will probably require but little paper at one time, it is best to cut the sheets into quarters, and make arrangements for sensitizing accordingly. Procuring a tray of the proper size to receive a quarter-sheet—I employ an agate-ware pan purchased at a house-furnishing store—and as much solution as can be made with three or four ounces of nitrate of silver, you will be equipped for a long time. When the bath shows signs of exhaustion, as evidenced by producing weak prints, add more silver. Always filter the solution into the pan before using, and filter it back into the bottle afterwards. Have another bottle containing water for rinsing the pan and filter, and as this gradually becomes charged with silver, it may be employed to dissolve fresh nitrate in, when necessary to replenish the bath.

After the bath has been in use for awhile, it will become discolored, by contamination with organic matter from the paper floated upon it. When this occurs, add five or ten grains of bicarbonate of soda to it, and set the bottle in the sun a few days, until the solution clears.

Having fumed the paper with ammonia, as directed above, cut it into pieces a little larger than the negative with which it is to be used, being careful to protect it meanwhile from bright daylight, which would darken it.

Fit a plate of clear glass in the printing-frame, and upon this lay the negative, back downwards. Then lay a piece of the sensitized paper on the negative, the albumenized side resting upon the gelatin film. Upon this place a thin pad of paper or cloth, then put in the back of the frame, and fix it by adjusting the springs. Place it now in the sunlight, and the printing process begins at once.

In case the negative be not very intense, that is, the dark parts of no great density, as shown by transmitted light, it is better to temper the effect of bright sunshine, by laying a thickness or two of white tissue-paper over the front of the frame, to which it may be fastened with a little paste. But in printing otherwise than in bright sunshine, or in case of very intense negatives, this may be omitted. From time to time, take up the frame, loosen one-half the back, and lift the edge of the paper, to see how the printing is progressing; and when it has reached the required depth in the shadows, remove the paper, and put it in another.

Keep the first print as a proof, and with it as a standard, print the subsequent ones much deeper, for in the process of toning, next to be considered, they will be bleached to a certain extent, and, if not printed stronger than the proof, will come out of the toning-bath weak and unsatisfactory.

After printing as many copies as you desire, lay them, one-by-one, on a plate of glass, and, with a rule and sharp knife, or the little instrument termed a trimmer, cut them to the required size.

Then place them in a vessel of water in a darkened room, and let them soak for an hour or more, changing the water occasionally, in order to wash out the free silver remaining in them.

TONING PRINTS.

Dissolve one drachm each of acetate and bicarbonate of soda, and half a drachm of common salt in a quart of water. Make this solution the day before it is required for use.

Dissolve fifteen grains of chloride of gold in seven and one-half ounces of water.

Take four ounces of the soda solution and half an ounce of the gold solution, mix and pour into a glass or porcelain tray that has been previously gently warmed. Into this lay the prints, washed as directed above; now turn them over one by one, and carefully watch the effect produced. After awhile you will observe that they begin to change color, the lighter parts growing lighter still, while the shadows become of a deep, rich purplish tint. Let the action go on until the half tones have become grayish, and the shadows almost black, then take them out of the bath and rinse them in water, after which lay them in a solution of hyposulphite of soda—one part of the salt to eight of water—for fifteen minutes. From the hypo solution you will transfer them, without rinsing, to a strong solution of common salt, where they should remain for five minutes; then wash them in running water for an hour or so—all night is better—or if this be impracticable, let them soak in a vessel of water for several hours with occasional changes of the water.

Pour the toning bath back into the bottle containing the soda solution. You can use it for months, adding each time the same proportion of gold as at first.

Lastly, while still damp, brush their backs with smooth starch paste, and fix them to cards or in an album according to your taste.

Another kind of print, a blue sickly-looking thing, is made with paper coated with an iron solution, but I shall not waste time in describing the process. Its only advantage is its ease of manipulation. Any old scrap of silvered paper, even though prepared months before, furnishes a much more satisfactory proof of the negative.

In finishing this part of the subject, I should, perhaps, write a few words concerning the wet-plate process. If you are to make all your exposures at home, this is quite as feasible as the process just described, and, everything considered, a little cheaper. The plate is coated, when required for use, with collodion containing certain bromides in solution, and is then placed for five minutes in a bath of nitrate of silver, forty grains to the ounce, and immediately transferred to the plate holder (specially made for this purpose) and exposed in the camera in the same way as a dry plate, but for about ten times as long. The development is much simpler and quicker than of dry plates, though not essentially different in principle. Printing and toning are, of course, identical.

Having a dry-plate outfit, one can at small expense add wet-plate apparatus to it, and thus be prepared for either, but I would hardly advise it. I did so myself, but in a few months discarded the wet-plate process altogether.

(To be continued.)

Hydrofluorate of Quinine is recommended by Weddel in the treatment of hepatic engorgements of malarial origin. It is soluble in water or alcohol.

EXAMINATION OF COMMERCIAL IODINE.*

BY MARY H. SPENZER, OF CLEVELAND, OHIO.

ELEVEN samples of resublimed iodine of commerce labelled G. Mallinckrodt & Co., Chas. Pfizer, Powers & Weightman, and Billing & Co., were subjected to the following tests:

1. *Appearance.*—Several substances can be detected by this means.

a. Water, by the sticky coherence of the iodine together, or to the side of the bottle.

b. Non-volatile substances, such as coal, black antimony, etc., can be inferred.

c. By the aid of a magnifying glass, minute, colorless needle-shaped crystals of cyanide of iodine can be detected.

2. *Odor.*—Iodine has not a very strong odor, therefore the very disagreeable odor of cyanide of iodine can be observed if present.

3. *Volatilization.*—Pure iodine should completely volatilize, leaving no residue when heated in a test tube; if otherwise, it is adulterated; cyanide of iodine, if present, will be seen sublimed as colorless crystals above the iodine.

4. *Solution in its several solvents.*

a. The solution in water should be of a yellowish-brown color, while if cyanide of iodine is present, the solution is much darker.

b. Ether and water. Pure iodine should make a perfect solution in ether; on the addition of water, if insoluble substances are present they will settle in the water.

c. Chloroform. If the iodine contains much water, the solution will be only translucent.

d. Sulphurous Acid. Pure iodine dissolves completely in sulphurous acid.

5. *Detection of chlorine and bromine.*

a. A sulphurous acid solution is supersaturated with ammonia water, and completely precipitated with nitrate of silver, filtered, and nitric acid added; any cloudiness or precipitate appearing denotes the presence of chlorine or bromine.

b. Boil an aqueous solution until all the iodine is liberated (test with starch), add nitrate of silver, the appearance of a precipitate or cloudiness indicates chlorine or bromine.

6. *Detection of cyanide of iodine.*

a. Cyanide of iodine has a very disagreeable odor.

b. Also by the appearance of colorless prismatic crystals in the iodine or above it when volatilized in a test tube.

c. By adding to a clear, aqueous solution of iodine a solution of caustic potash until decolorized, then a few drops each of solution of ferric chloride and ferrous sulphate and, lastly, hydrochloric acid in slight excess, when the formation, at once or upon standing, of a blue precipitate will prove the presence of cyanide of iodine.

7. *Detection of calcium salts.*

To an aqueous solution of iodine, boiled until all the iodine is liberated, ammonium oxalate and ammonia water are added and allowed to stand twelve hours, when the presence of a precipitate indicates calcium salts.

8. *Estimation of iodine.*

This is done volumetrically by means of a standard solution of hyposulphite of soda, which, after being compared with standard solution of iodine is standardized with pure, dry iodine (made by resubliming pure iodine between two weighed watch glasses) and allowed to cool in a desiccator over sulphuric acid before use; or, if the iodine contains chlorine or bromine, by triturating with one-sixth of its weight of iodide of potassium, drying in a desiccator, subliming between watch glasses, and resubliming when wanted for use. The iodine equivalent to 1 C.c. of standard hyposulphite of soda is noted. (When making this and subsequent iodide of potassium solutions, it is necessary to use potassium iodide free from iodate.)

About 0.5 gramme of iodine is accurately weighed in a small tube, dissolved in a small flask containing 10 C.c. of 10% solution of potassium iodide; when completely dissolved, standard hyposulphite solution is run in from a burette, until completely decolorized, then 3 C.c. of mucilage of starch is added, and the liquid subsequently titrated with standard iodine solution to incipient blueness. The amount of iodine solution used, deducted from the cubic centimeters of hyposulphite used, equals the number of cubic centimeters of hyposulphite required to neutralize the iodine; when multiplied by the previously determined factor equals the amount of iodine in the sample examined.

Appearance.	Odor.	Volatilization.	Solution in water.	Solution in ether and water.	Solution in chloroform.	Solution in acid sulphurous.	Chlorine and bromine.	Cyanide of iodine.	Calcium salts.	Estimation of iodine.	Estimation of water.
1. Large crystals, slightly adhesive.....	Normal..	Complete.	Yellowish-brown.	Complete.	Complete	Complete.	None.....	None.....	None.....	98.454%	1.53%
2. Large, clean crystals, slightly adhesive...	Acetous.	"	"	"	"	"	"	"	"	97.600%	2.38%
3. Medium clean crystals, slightly adhesive.	Normal..	"	"	"	"	"	"	"	Trace	99.161%	0.84%
4. Large, clean crystals, adhesive	"	"	"	"	"	"	"	"	"	98.210%	1.76
5. Small crystals, adhesive in lumps.....	Ethereal.	Slight residue.	"	"	"	"	"	"	"	98.966%	1.00%
6. Medium crystals, slightly adhesive.....	Normal..	Complete..	"	"	"	"	"	"	"	97.673%	2.29%
7. Small, greasy crystals, adhesive in lumps	"	Slight residue.	"	"	"	"	"	"	"	96.585%	3.43%
8. Small crystals, adhesive.....	"	"	"	"	"	"	"	"	"	97.390%	2.57%
9. Large crystals, adhesive.....	"	"	"	"	"	"	"	"	"	97.917%	2.00%
10. Large crystals, adhesive.....	Acetous.	Complete..	"	"	"	"	"	"	"	97.732%	2.25%
11. Medium, greasy, adhesive crystals.....	"	"	"	"	"	"	"	"	"	96.740%	3.20%

9. *Estimation of water.*

Heat a small porcelain dish with a porcelain or agate pestle on a water bath for half an hour; allow to cool in a desiccator, and weigh; then triturate about 2 grammes of iodine with 2 or 3 times its weight of pure mercury, and adding from time to time small quantities of alcohol until complete union is effected (determined by looks and odor); this is then allowed to dry on a water bath at 212° F.; until, after cooling in a desiccator, the weighings remain constant; when the loss in weight between the iodine and mercury used and the last constant weight equals the amount of water in the original iodine.

It will be seen from the schedule that the iodines examined were quite up to the pharmaceutical standard.

* Read before the Ohio State Pharmaceutical Association, May 21st, 1885.

[ORIGINAL COMMUNICATION.]

NAPHTHOL AS AN ANTISEPTIC.

MR. W. J. RIGNEY states that he has recently obtained results with naphthol which would place it among the most efficient antiseptics. The naphthol experimented with was first purified and crystallized, and in this state it is an odorless white powder with a hot peppery taste. To 500 C.c. of beef-tea was added 0.3 Gm. of naphthol and allowed to stand for a period of 30 days, when it was found to have retained its characteristic odor as fresh as when first prepared. A beef lung which had already commenced to putrefy was immersed in a solution containing 1 part of naphthol to 500 parts of water; the solution at first became red owing to the particles of blood which adhered to the lung; it soon grew turbid and finally settled as a dull gray precipitate, leaving the solution clear. The lung was withdrawn, and all smell of putrefaction was found to have been removed, it was then returned to the solution, and after standing some time it was found to have an odor resembling that of beef-tea and has remained thus for four months.

[NOTE.—On naphthol as an antiseptic and disinfectant, see also the article on page 291 of NEW REM. for 1883.—ED. A. D.]

Cold as an External Remedy in Sciatica.

DR. DEBOVE announces that cold is a prompt remedy in sciatic neuralgia, having succeeded in curing, by means of it, almost instantaneously, the most obstinate cases which had resisted other remedies.

He employs chloride of methyl which, on evaporation, produces a cold of 23° C. (9.5° F.). It is easily managed and not very high in price (about 6 francs per liter in Paris).

[NOTE.—We are not aware that it is kept for sale anywhere in *this* country. In Europe, it has been used already for many technical and other purposes, and certain manufacturers make a regular business in preparing and shipping it. At ordinary temperatures, chloride of methyl (CH_3Cl) is a gas which can be reduced to a liquid by cold and pressure.—ED. A. D.]

By means of a siphon containing liquefied chloride of methyl, a very fine jet of the latter is made to play against the skin along the whole extent of the sciatic nerve, from the sacrum to the malleolus. The result, according to Dr. Debove, is almost instantaneous. The operation is but little painful, the shock being much more easily borne than that of the actual cautery. Sometimes a little vesication is produced along the track of the nerve, but never any cauterization.—*Mon. Thérap.*

AN IMPROVED ALCOHOL-LAMP AND CONSTANT-LEVEL WATER BATH.

C. REINHARDT has made still further improvements in the alcohol lamps and water-baths previously designed by him (see AM. DRUGG., 1884, 43). The defects inherent in the former construction were, first, the difficulty of moving the apparatus about; second, the fragility of the glass feeding tube, and third, the increased expense when more than one lamp was used.

In many laboratories where illuminating gas is not accessible, or has been displaced by the electric light, the use of alcohol lamps for heating is necessary, and will probably become still more so in the future.

Figs. 1 and 2 represent the side view and ground-plan of the arrangement The glass globe *a*, of the capacity of about 1 gallon, is closed above with the rubber stopper *b*, and below with a doubly perforated stopper, carrying two tubes, one of which, *g*, is of glass and serves to admit air, while the other, *e*, is of brass and may be partly or entirely closed by means of the stop-cock *f*.

A zinc mantle serves to support the globe and to protect the tubes. From the brass feeding tube, several rubber-tubes (three in the annexed cut) lead to as many alcohol lamps (*h*), each provided with a separate stop-cock *k*, and a regulating screw *i*.

The space *A* in which the water-bath (*W*, Fig. 1) and alcohol lamps are situated, is best entirely separated from the alcohol reservoir by a wall *B*, for greater security.

In order to prevent the alcohol in the reservoir *a* from running too rapidly into the lamps, or overflowing from the latter, the following contrivance is used.

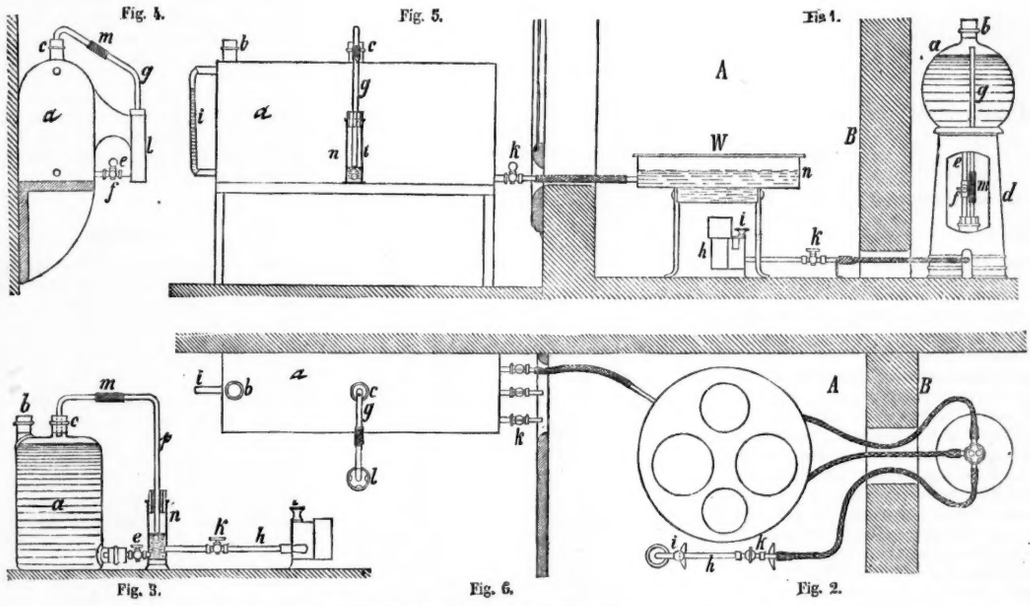
Instead of connecting the feeding tubes directly with the reservoir (as is shown in Figs. 1 and 2 for brevity's sake), the alcohol is first made to pass into a second reservoir where its level is regulated. As this arrangement is the same as that adopted by the author for maintaining a constant level in the water bath, its principle is separately illustrated in Fig. 3. The reservoir *a* (whether a water or alcohol reservoir) is connected with a small brass cylinder as shown in the cut. From the cylinder lead one, two, or more branch tubes to one or more water baths, or, in the case of alcohol, to alcohol lamps. Supposing *a* to be full of liquid and the stop-cocks at *e* and *k* to be open, then liquid (water or alcohol, as the case may be) will flow through the stop-cock *e* into the cylinder *n*, until the orifice of the tube is covered, but, at the same time, liquid will flow off through *k* in such a stream as may be regulated by the stop-cock.

The height to which the liquid can rise in the water bath or alcohol lamp, therefore, depends on the height of the column of liquid which can collect in the small brass reservoir *n*, and this is regulated by the depth to which the glass tube *p* dips into it.

As stated before, the constant level in the water baths is maintained in the same manner. In Figs. 4, 5, and 6, *a* is the reservoir, *l* is the regulating brass reservoir (corresponding to *n* in Fig. 3), *b* is an opening though which the reservoir is refilled and which is kept closed with a rubber stopper.

In the special case of the water baths, which is illustrated in Figs. 4, 5, and 6, the water regulated in height by the small reservoir *l*, flows through *k* into the water bath *W* (Fig. 1), where a constant level is maintained.

The reservoir *a*, if intended for a water bath, may be permanently connected at *b* with the system of water-pipes, if such are available; all that is necessary being to shut off the connection with the water bath while refilling it, and shutting off the connection with the mains when restoring that with the water-bath.



An improved alcohol-lamp and constant-level water bath.

A New Test for Citric Acid.

WHEN citric acid is fused with glycerin, in proper proportions, and then evaporated to dryness, there results, if the temperature has been kept as low as possible, a very porous, faintly yellow mass, which appears hard and brittle when cold, but becomes transparent when covered with water while still warm, and then has the appearance of water-soaked gelatin.

If this glycerin compound is dissolved in boiling water of ammonia, and the solution allowed to evaporate spontaneously, the inspissated residue acquires, after a few days, a faintly greenish tint, due to oxidation by the air. If the original solution is freed from ammonia as much as possible, by further evaporation, then diluted with water and treated with peroxide of hydrogen, the green color appears immediately, and very intensely. The same green color may also be produced by adding red fuming nitric acid to the residue left after evaporation, provided it has become neutral, but the green color, in this case, changes to dark-blue under certain conditions. These tints may be preserved for several days even in rather dilute solutions.

By protracted boiling, the solution turns brown, and the slightest excess of acid produces complete discoloration.

The reaction is best performed thus: 1 Gm. of crystallized citric acid and 0.6 to at most 0.8 Gm. of thick glycerin are carefully melted together, upon a small porcelain capsule, over a feeble flame, until the mass ceases to be liquid, and just becomes hard, and proves hard and porous under strong evolution of vapors. The liquid is concentrated until it is but feebly ammoniacal, and, while still warm, mixed with 1 to 3 drops of diluted (1 to 5) red fuming nitric acid, or the same amount of usual 8 to 10% peroxide of hydrogen (on this, see AM. DRUGG., 1884, 93), prepared with hydrochloric acid. Either of them will produce the above-mentioned tints.

Neither tartaric nor malic acids were found to produce this reaction.—*Zeitsch. Anal. Chem.*, 24, 201.

[*Note.*—It is evident that much depends, in this reaction, upon the proper temperature. The author's crude method of fusing the citric acid with glycerin appears to be capable of much improvement, by devising some plan of attaining a definite temperature, which may perhaps be best accomplished by using some neutral salt at its melting point, provided the latter is within the requisite limits of temperature, and the salt does not interfere with the reaction.—ED. AM. DR.]

Chemistry and Botany of the Strychnos Nux Vomica Indigenous to Ceylon.

A SHORT time ago, W. R. Dunstan and F. W. Short published an elaborate paper on this subject (*Pharm. Journ.* [3], 15, 1–6).

The conclusions arrived at by the authors are that the pulp of the fruit is poisonous, and in addition to strychnine and brucine, contains the glucoside *loganin*.

The amount of alkaloid in the seeds of *Strychnos Nux-Vomica* varies directly as their size and inversely as their number in the fruit. The seeds from the Ceylon plant are especially rich in alkaloid, one specimen yielding 5.34 per cent.—*Journ. Chem. Soc.*

Preservation of Succulent Plants.

P. HENNINGS writes on this subject in the *Verhandl. d. Botan. Vereins d. Provinz Brandenburg*, XXV., 219, as follows:

During the last three years, certain fruits, flowers, and other portions of plants are preserved in the botanical museum of the University of Berlin by means of a solution composed of 4 parts of water and 1 part of alcohol saturated with salicylic acid. This method was recommended to the director of the museum, Prof. Eichler, by Prof. Pfeffer. Plain alcohol used to be employed formerly. It has been ascertained that plants which have lain for some time, yes, even for a long time, in the above-named mixture, are found, when taken out, to dry quite rapidly, and did not lose their natural appearance, while, if they had been dried, they would have turned more or less black. Many succulent plants (from the orders Begoniaceæ, Crassulaceæ, Euphorbiaceæ, Cactaceæ, etc.) have been beautifully preserved by this method. It is especially useful in such plants as are very juicy or contain a viscid mucilage, or have a thick epidermis, and are, therefore, difficult to dry. It is also very advantageous in the case of those which contain a dark coloring matter—such as many Aroideæ, Orchideæ, Rubiaceæ, etc.—which makes its appearance when the plant dries.

Quinine.* "Chininum."

CHININA, *Rom.*, *Suec.*, Quinina, *Belg.*, *Hisp.*, *U. S.*, Quinine hydratée, *Gall.*

$C_{20}H_{24}N_2O_2 = 324$ or $C_{40}H_{24}N_2O_4 = 324$

crystallized

$C_{20}H_{24}N_2O_2.3H_2O = 378$ or $C_{40}H_{24}N_2O_4.6HO = 378$

(Aust., Belg., Gall., Germ. I., Græc., Helv., Hisp., Hung., Neerl., Rom., Russ., Suec., U. S.).

1 part of *sulphate of quinine* is dissolved in 20 parts (Gall., Græc., Helv.), or in 50 parts (Belg.) of *water* with the aid of sufficient diluted sulphuric acid (1.12 parts of 10%, or 1 equivalent, Gall.), and the solution precipitated by enough *ammonia* (Belg., Græc., Hisp.) or dilute solution of *potassa* (Græc.), or solution of *soda* (Helv.) to completely precipitate it and leave a slight excess of the alkali. The Pharm. Gall. uses for this purpose a large *excess of ammonia* (1.2 parts of 0.925, or more than 3 equivalents) and directs to let the mixture stand for 24 hours, with repeated stirring, in order to cause the quinine to separate in a *crystalline* condition with 6 mol. of water. The precipitate is then collected, well washed with cold water, and dried in the open air (Gall., Hisp.), or at 15°–20° (Helv.), or with gentle heat (Belg.)

During the precipitation, the quinine separates first in an *amorphous* and *anhydrous* state, as a white, cheesy precipitate, which rapidly becomes *crystalline* by taking up water. It is probable that upon this property depend the very divergent statements contained in the several pharmacopœias as to the physical properties and especially the solubility of quinine in different liquids. The *anhydrous* base is not official as such, by name, in any pharmacopœia. Nevertheless the quinine of the Aust., to judge from its table of equivalents, would seem to be intended as *anhydrous*, differing thereby from the Hung., though this has the same text. Even the Germ. and Græc., which describe the substance as *amorphous* and *non-crystalline*, seem to have meant the anhydrous alkaloid. More doubt is attached to the kind meant by the Rom., Neerl., and Suec., which require their quinine to be "scarcely" or "generally not" or "only rarely" crystalline, while the "micro-crystalline" quinine of the Helv., without doubt, is to be regarded as hydrate. The hydrate is meant, beyond a doubt, as evidenced both by formula, molecular weight, and actual words, in the Belg., Gall., Hung., Russ., and U. S. According to the Neerl., the quinine is easily fusible; according to Gall. at 57° C.; accord. to Aust., Hung. and Rom. at 120° C., while, in reality, the melting point of the hydrate is at 57° C., and that of the anhydrous base at 177° C. When ignited, quinine chars, and on protracted heating is completely, though slowly, dissipated. The hydrate loses ⅝ of its water when exposed to dry air (Gall.), or at 100° C. (U. S.). The remainder of the water escapes at 100° C. (Gall.); at 125° C. (U. S.). The taste is bitter, and the reaction alkaline.

Regarding its solubility, we have the following statements.

1 part of quinine is soluble in:

	Water.		Alcohol.	Ether.	Chloroform.	Glycerin.
	Cold.	Hot.				
Rom.	100*	..	Almost in all proportion.	60	2	200
Aust., Hung.	400	..	At 90%.....			
Belg.	400	200	2 hot.....			
Germ. I.	1200	250	Easier than in water...	Less than in Alcohol.	....	....
Russ.	1200	260	3 at 90%.....	25	6	200
United States.	1600	boiling 700 boiling	2 boiling	ca. 25	ca. 5	ca. 200
Gall.	1670	Easily†	Easily.....	Easily.....	..	....
Neerl.	Very diff.	Difficult.	Very easily.....	Very easily.....	Very easily...	....
Græc.	Very diff.	..	More read. than in water	....	....	....
Suec.	Scarcely.	..	Very easily.....	Not difficultly.....	....	....
Helv.	Insoluble.	..	Very easily.....	Less than in alcohol..	Very easily...	....

* Probably a misprint for 400. † Incorrect.

Besides, quinine is also soluble in benzin, benzol, carbon disulphide and oils (Russ., U. S.); ammonia increases its solubility in water, fixed alkalies diminish it; with acids it forms salts of very varying solubilities. The solutions are *lævogyre* (Gall.), and in presence of most acids, especially of sulphuric acid, are *fluorescent*. *Non-fluorescent* solutions, however, are produced by hydrochloric, hydriodic and hydrobromic acids, these being even capable of destroying any already existing fluorescence. When mixed with fresh chlorine water and a little excess of ammonia, quinine and its solutions acquire an *emerald-green* color.

When concentrated *sulphuric acid* is poured on quinine, the latter should not be colored at all or only pale yellow (U. S.), not red (Germ. I., Russ.) or black (salicin, sugar, etc.), not even after addition of a few drops of solution of bichromate of potassium (Neerl.). Nor should it be colored red by *nitric acid* (morphine—Neerl., U. S.). When warmed with *milk of lime* it should not evolve ammonia (Germ. I., Russ.). When its solution in a dilute acid is precipitated by ammonia and ether is added immediately, the precipitate should disappear, and there should be formed, on standing, two perfectly clear layers of liquid, otherwise quinidine, cinchonine and [or] cinchonidine are present (Germ. I., Russ.).

If one Gm. of quinine is triturated with 0.5 Gm. of sulphate ammonium and 5 C.c. of water in a mortar, the mixture completly dried in a water-bath, the residue (which should be neutral to test paper) agitated with 10 C.c. of distilled water, this mixture macerated at 15° C. for half an hour. then filtered through a small filter, 5 C.c. of the filtrate taken in a test-tube, and 7 C.c. of water of ammonia (sp. gr. 0.960) then added, on covering the mouth of the test-tube with the finger, and gently turning it until the ammonia is fully intermixed, a clear liquid should be obtained. If the temperature of maceration has been 16° C., 7.5 C.c. of the water of ammonia may be added; if 17° C., 8 C.c. may be added. In each instance, a clear liquid indicates the absence of more than about 1 per cent of cinchonidine and quinidine, and of more than traces of cinchonine (U. S.).

* Translated from Dr. Bruno Hirsch's Universal-Pharmacopöe, see page 160. The abbreviated words refer to the different pharmacopœias, *Rom.* = Roumanian; *Hisp.* = Spanish; *Gall.* = French; *Helv.* = Swiss; *Græc.* = Greek; *U. S.* = United States, etc., etc.

Thalline.

ON page 14 of our January number, we gave an account of this new antipyretic, which is a derivative of chinoline discovered by Prof. Skraup, and was found to have properties analogous to kairine and antipyrin. For several months afterwards, a large number of clinical experiments were undertaken, with the observance of the greatest care and exactness, and the results having shown it to be as first represented, it has now been put upon the market, its price being, for the present, 200 marks per kilogramme (or about $1.50 per ounce).

As soon as the process admits of simplification, a reduction of this price may be expected.

Thalline has yielded excellent results as an antipyretic in phthisis, peritonitis, pneumonia, erysipelas migrans, facial erysipelas, etc.; in scarlatina, measles, and other febrile children's diseases; in typhus, pleurisy, bronchitis, acute rheumatism, and puerperal fever.

It is best administered in wafers, in doses of 0.25 to 0.50 Gm. (4 to 8 grains). For children, the following combination is one of the best.

	Gm.	
Tartrate of Thalline.....	2.0	30 grains.
Distilled Water.....	60.0	2 fl. oz.
Syrup of Black Cherries,	40.0	1 fl. oz.

(Pharm. Germ. II.)

[Instead of the latter, Syrupus rubi idæi, syrup of raspberry, may be used.]

Dose: A dessertspoonful every hour until the temperature begins to lower, and a light perspiration sets in.

The urine of persons treated with thalline has, in thin layers, a greenish tint, and in dense layers a brownish-yellow color.

Thalline is, properly speaking, *tetraparahydrochinanisol*, but, as this name is unpractical for prescribing, the former name (thalline) has been selected, because its aqueous solution is rendered green by ferric chloride and other oxidizing agents.—MR. BERNBECK, in *Pharm. Zeit.*, No. 41.

Powdering Jequirity Seeds.

MR. GERRARD recently received a few pounds of the seeds of *Abrus precatorius* for the purpose of preparing a peculiar ferment which is present in the seed. He was astonished to find a very great difficulty in pulverizing the seeds. In fact he had to give up the attempt as hopeless. They are coated with a peculiar varnish-like coat, and he tried the effect of various solvents upon them for the purpose of finding whether he could penetrate into the albuminous part of the seed. The coating was, however, so obstinate towards solvents that, though he had boiled the seeds in strong nitric acid, in strong sulphuric and strong nitric acid, and even in a solution of caustic soda (1 in 3), he had failed to produce any effect upon them. After that he thought it was quite time to send the seeds to the drug mill.

[Mr. Chubb states that he has reduced the seeds to powder by grinding them in a mortar with coarse powdered flints.]—*Pharm. Journ.*, April 11th.

Fly-Plates.

SOME time ago, a novel form of fly-destroyer was introduced in Europe, namely, fly-paper shaped in the form of plates. The government, however, stopped their sale on account of their containing arsenic. Mr. Adolph Vomacka now suggests to utilize this idea, with the modification of substituting non-poisonous substances for the arsenic. He recommends the following: 150 parts of Surinam quassia are thoroughly boiled with 400 parts of water, and the strained decoction concentrated to 50 parts. On the other hand, a tincture is prepared from 25 parts of long pepper and 80 parts of dilute alcohol, by macerating for three days, filtering and coloring with fuchsine. This tincture is mixed with the extract of quassia, the mixture allowed to settle, the clear liquid heated, and 10 parts of chloride of cobalt and 2 parts of tartar emetic dissolved in it. Plates made of coarse bibulous paper are dipped into this solution, and when saturated, set aside to dry. If it is desired to employ arsenic, a small quantity of arsenious acid [about ½ part] is dissolved in the liquid instead of the cobalt and tartar emetic.—*Rundschau* (*Leitmeritz*).

Estimation of Free Sulphuric Acid in Vinegar.

B. KOHNSTEIN has devised the following expeditious method.

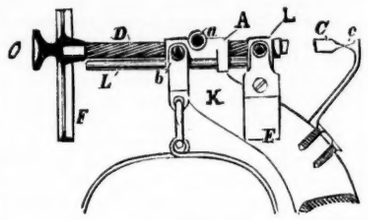
Shake 100 C.c. of the vinegar with freshly ignited magnesia, until the liquid ceases to have an acid reaction, then filter. Evaporate 25 or 30 C.c. of the filtrate to dryness in a platinum capsule, then ignite the residue at a low red heat. This causes the conversion of the acetate into carbonate of magnesium, while the sulphate of magnesium remains unaltered. In order to render the residue more friable, it is moistened with carbonic acid water, and again evaporated, then digested with hot water and filtered. When the washings cease to give a reaction of sulphuric acid, and any lime that might be present in the filtrate has been precipitated, the magnesia now remaining in the filtrate (and washings) is precipitated as pyrophosphate, and from this the quantity of sulphuric acid is calculated.

Should magnesium salts occur in the original vinegar, these may be determined separately by evaporating a portion of the vinegar to dryness, igniting, redissolving the residue with a little hydrochloric acid, separating any lime, and determining the magnesia as pyrophosphate, which is then deducted from the quantity subsequently found.—*Dingl. Pol. J.* and *Chem. Zeit.*

A NEW RAPID-WEIGHING BALANCE.

THE accompanying cut illustrates a new principle for constructing rapid-weighing scales or balances, which appears to have this advantage over spring-balances that it is much less liable to produce errors by reason of loss of elasticity or wearing out of parts.

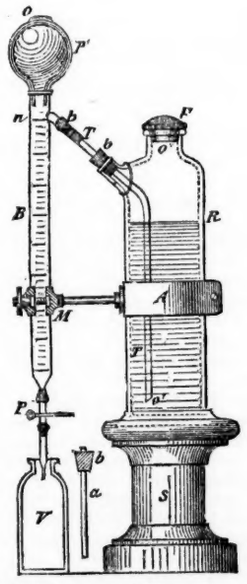
Upon the curved arm *K* of the rigid frame of the balance is arranged a hollow tube *A*, resting in bearings *a*, from which is suspended the scale-pan by means of kife-edges *b*, attached to each side. Through the hollow tube *A*



passes a long pin or guide-rod grooved with a quick thread, and carrying at its inner end, *L*, the counterpoise *E*.

This guide-rod or pin, when turned by means of the knob *O*, will, of course, travel in the grooves of the tube *A*, a full revolution of it being sufficient to bring it up against the stop *C*. The rate of rotation is indicated by a hand upon the dial *F*.

The substance to be weighed is placed upon the scale-pan, and the knob *O* turned until the pin *D* has been carried far enough inward for the counterpoise *E* to balance the scale-pan. The weight is then read off from the dial. This scale has been patented by C. Wittkowsky, of Berlin (Germ. Pat. 30,774; Aug. 4th, 1884).



IMPROVED BURETTE FOR ALKALIMETRICAL AND OTHER SIMILAR DETERMINATIONS.

THE advantages of the burette here illustrated consist of the automatic adjustment of the contained liquid at the zero mark, in the rapidity of use, and the security of the contents both against accident and against the influence of air or other contaminations.

R is a reservoir for the volumetric liquid, *S* a stand for supporting the reservoir, *B* a burette divided into ⅓ C.c, *P* a rubber bulb with a valve opening at *o*.

The apparatus having been put together, the reservoir *R* is filled with the volumetric liquid, and the air exhausted by repeated compression of the rubber bulb. The vacuum thus created causes the liquid in the reservoir to rise up into the burette, which will be filled to the mark o.

It is stated that vessels of the form *V*, for performing the tests in, are handier than flat ones. The liquids are mixed by agitation instead of by stirring with a glass rod. The rod *a* (with its stopper *b*) serves for taking out sample drops.—*Sucrerie indigène*, 24, 21. *Chem. Centralbl.*

On Compounds of Arsenious with Arsenic Acid.

WHEN arsenious acid is oxidized with nitric acid, an acid liquid results, which sometimes still contains arsenious acid, which latter may be recognized by the fact that the liquid still has reducing properties. On concentrating such a solution, small needle-shaped crystals are separated which have the composition $2As_2O_5.3As_2O_3.3H_2O$. This compound may be obtained in larger quantity by gently heating 100 Gm. of arsenious acid with 25–30 C.c. of concentrated nitric acid. Soon after the reaction has begun, and red vapors are evolved, the mixture congeals to a mass consisting of the above-mentioned compound and arsenious acid.

When brought in contact with water the compound is split into its constituents. This is, however, not the only compound which may be formed by the two bodies. If a large quantity of arsenious acid is left unoxidized, a compound results, crystallizing in rectangular scales, having the composition $As_2O_5.2As_2O_3.aq.$ But if arsenic acid is in excess, fine crystals of $As_2O_5.As_2O_3.aq.$ result. Both of these compounds are likewise decomposed by water.—A. JOLLY in *Journ. f. prakt. Chem.*, 1885, 432.

Filtration of Benzin Solutions.

A. GAWALOSKI communicates a useful expedient for causing benzin solutions to pass readily through filters previously moistened with aqueous liquids.

He is often in the habit of making soap-analyses, and in such cases decomposes the soap with sulphuric acid, transfers the separated fatty acids upon a filter, and washes with water. The filtrate and washings are freed from any retained fatty acids by shaking with petroleum ether, and this ether is then used to dissolve the fatty acids upon the filter [the ethereal solution being finally evaporated and dried]. In order to be able to pass the petroleum ether solution through the filter, he has hitherto been compelled to dry the filter for many hours before it would permit the ether to run through.

He has now found that by pouring a little absolute alcohol upon the edges of the filter, the latter is so thoroughly freed from the absorbed water, that it will immediately permit the benzin solution to run through, almost in a continuous stream, thereby shortening the time most considerably.—*Chem.-techn. Central-Anz.*, No. 29.

Parthenine, obtained from *Parthenium Hysterophorus*, an herb growing in Jamaica, has been used successfully by Tovar in the treatment of facial neuralgia. One-tenth of a grain was given hourly, and then the dose was decreased in size and frequency. In Jamaica, the drug is used in skin diseases.

The Cuban plant known as "bitter broom" (*escoba amarga*) is said by Dr. Antonio L. Esporon, of Havana, to be a source of this alkaloid. He reports two cases of neuralgia treated successfully with this remedy, and says he has employed it in many cases of facial neuralgia with great success, and believes that it is especially indicated in neuralgias of malarial origin.

Fermentative Processes in the human Mouth and their Prevention.

ACCORDING to Miller, no less than five different fungi exist in carious human teeth. These fungi have the property of causing fermentation in solutions containing fermentable carbohydrates, and producing, as one of the products, optically inactive lactic acid. Free oxygen is not required for the production of this fermentative action, though it is probably accessory for the life and growth of the fungi. The latter have also the power of inverting sugar, that is, to convert infermentable cane-sugar into fermentable glucose.

When sound teeth are exposed to the action of these fungi, they are rapidly deprived of lime, and, on microscopic examination, large masses of bacteria will be found in the dental channels. Experiments were made with various antiseptics, to ascertain which would answer best to retard or to prevent this fermentation. The following are the results:

The fermentative action is

	prevented by 1 in	arrested by 1 in
Corrosive Sublimate,	500,000	100,000
Nitrate Silver,	100,000	50,000
Iodine (in Alcohol),	15,000	6,000
Iodoform,	10,000	5,000
Naphthalin,	9,000	4,000
Ess. Oil Mustard,	5,000	2,000
Permang. Potassium,	2,000	1,000
Oil Eucalyptus,		600
Carbolic Acid,	1,000	500
Hydrochloric Acid,	1,000	500
Carbonate Sodium,	200	100
Salicylic Acid,*	125	75
Alcohol, absol.,	25	10

These results are of considerable interest not only to dentists, but also for the preparation of efficient tooth-powders. [Of course, some of the above agents are unsuitable for use in tooth-powders. But naphthalin (perfumed with oil of bergamot), oil of eucalyptus, and carbolic or salicylic acids will be quite appropriate.]—*D. med. Woch.* and *Chem. Centralb.*

Contributions to the Knowledge of Pepsin.

C. SUNDBERG has prepared *pure* pepsin, free from albumin, by destroying the "rennet-ferment" by means of heating to 40° C. (104° F.), during which operation any albumin still present is also converted into "pepsin." The pepsin solution thus obtained is mixed with calcium chloride and sodium phosphate, then neutralized with very dilute ammonia, and this operation repeated several times, until a precipitate is no longer produced. This precipitate, consisting of calcium phosphate and pepsin, is washed with water, dissolved in the smallest possible quantity of 5% hydrochloric acid, and then dialyzed until the contaminating salts are removed. The clear, colorless solution finally obtained excels the original solution in digestive power.†

When tested qualitatively with reagents for albumin, the solution gave negative results.

The only agent which precipitated the pepsin was absolute alcohol, which did not, however, diminish its digestive power, except when allowed to be in contact with it for a long time, in which case it became insoluble and inert. These results render it very probable that pepsin is a modification of albumin.—*Zeitsch. f. Phys. Chem.*, 1885, 319.

* Dissolved in alcohol.

† We believe that some useful hints may be derived from the statements here made, for preparing a purified pepsin (free from mucus, etc.). Regarding the process of dialysis, our readers will do well to refer to the important article in NEW REM., 1883, p. 203. "On Dialysis by means of Chloroform Water, etc."—ED. AM. DR.

Analysis of Liebig's Extract of Beef.

ACCORDING to R. Sendtner, the analysis of Liebig's extract of beef is carried out, in the hygienic institute of Munich, in the following manner:

1. *Ash:* One gramme of the extract is carbonized in a platinum capsule, and afterwards incinerated until a white ash is left.

2. *Total Dry Solids:* Two grammes are dried for thirty-six hours at a temperature of 100° C.

[*Note.*—In our experience, it is next to impossible to obtain reliable results by attempting to dry even very thin layers of the extract by itself alone, as it obstinately retains moisture. The plan which we have found to answer best is to dissolve a definite weight (say 1 Gm.) of the extract in water, and to mix this intimately with a known weight of sugar of milk, previously dried to a constant weight in a tared capsule (with rod), the mixture being frequently stirred towards the end, and care being taken that no loss may occur by careless manipulation.—ED. AM. DR.]

3. *Solids soluble in Alcohol:* Two grammes are dissolved in 9 C.c. of water, and precipitated by adding 50 C.c. of alcohol of 93%. The liquid is poured off, and the copious precipitate which adheres strongly to the glass washed with alcohol of 80% until the latter ceases to dissolve anything. The united alcoholic liquids are evaporated and the residue dried for six hours at 100° C.

[In this case the time may also be much shortened by evaporating the solution upon sugar of milk. Powdered pumice stone or other similar absorbents may, of course, be used in place of the sugar of milk.—ED. AM. DR.]

Genuine Liebig's Extract of Beef should yield:

Ash ..... 22–25%.
Water ..... 16–21%.
Alcoholic Extract ..... 56–65%.

—*Zeit. Anal. Chem.*, 1885, 292.

The British Opium Trade with China.

THE *Standard* reports that the new convention between China and England (India), in regard to the opium trade, has been practically accepted by both governments, though it had not yet been signed at the time when the news reached the *Standard*. The convention is in form of a supplementary article to the treaty of Chefoo negotiated in 1876 by Sir Thomss Wade. The two principal stipulations are: 1, the abolition of the inland obstacles, and 2, the establishment of a uniform inland duty (so-called *lekin*). The latter is now put at 60 taels (£20 sterl.) per case, while the duty of import established by the treaty of Tientsin, viz., 30 taels per case, remains as before. Heretofore, the *lekin* varied in the different harbors, and according to the whims of the local authorities from 21 to 86 taels per case, and was under the control of special officials; while hereafter the full amount of 90 teals, or £30 per case (30 for import and 60 as lekin) is to be paid immediately on landing the opium. No further duty or tax will then be collected upon it in any part of the Chinese Empire.

Anisic Acid, obtained by oxidation of the oil of anise, is spoken of as possessing properties analogous to those of salicylic acid as an antipyretic and antiseptic. Its prismatic, colorless crystals are soluble in alcohol and ether. Large intravenous injections have caused epileptoid convulsions in animals.—*N. Y. Med. Jour.*, from *Gazz. Med. Ital. Lomb.*

On the Absorption of Petroleum Ointment and Lard by the Skin.

E. JÆRSS has investigated the question whether ointments made with vaseline or other petroleum ointments are really as difficult of resorption by the skin, or of yielding their medicinal ingredients to the latter, as has been asserted. In solving this question, he considered himself justified in drawing conclusions from the manner in which such compounds behaved towards *dead* animal membrane. If any kind of osmosis could take place, he argued, from ointments prepared with vaseline, etc., through dead membranes, such osmosis would most probably also take place through living membranes. At all events, the endosmotic or exosmotic action of the skin of a living body must necessarily play an important rôle in the absorption of medicinal agents; and on the other hand, it is plain that fats which render the living skin impermeable necessarily also diminish, or entirely neutralize, its osmotic action. To test this, the author made the following experiments:

Bladder was tied over the necks of three wide-mouthed vials, with bottoms cut off, and each was filled with iodide of potassium ointment.

No. 1 contained an ointment made with lard.

No. 2, one made with unguentum paraffini (Germ. Pharm.), and

No. 3, one made with ung. paraffini mixed with 3 per cent of lard.

All three vials were then suspended in beakers filled with water. After standing 24 hours, at the ordinary temperature, the contents of none of the beakers gave any iodine reaction. After having been placed into a warm temperature, between 25–37° C. all three showed iodine reactions after three hours, Nos. 2 and 3 very strongly, No. 1 (with lard alone) very faintly.

The same experiment was now repeated, with the precaution that the bladder was previously washed completely free from chlorine. Each vial was suspended, at a temperature of 25–27° C. in 50 Gm. of distilled water. After three hours, the contents of No. 1 (containing the ointment made with *lard*) gave *no* iodine-reaction, the contents of the other two, however, gave traces. After eight hours no further change had taken place. The temperature was now raised to 30–35° C., and kept so for eight hours. All three beakers now gave a strong iodine-reaction, 0.2 C.c. of normal silver solution being required for each 15 Gm. of the contents of the beakers.

In addition to the iodide, some of the fatty base had osmosed through the membrane in each case.

The next experiment was made by substituting a piece of the skin (freed from chlorine by washing) of a freshly-killed sheep, for the bladder. The ointment in No. 3, in this case was made with *ten* per cent of lard. No reaction was obtained, at the ordinary temperature, after 12 hours; nor after 8 more hours, at a temperature of 25°–30° C. After letting them stand for 8 hours longer at 30–37° C., a faint reaction was obtained in the case of the ointment made with ung. paraffini; a still fainter with No. 3; but no reaction at all with No. 1 (that made with lard). None of the fats passed through by osmosis. After 8 hours more, the iodine reaction was quite decisive in all cases, but no fat had passed through even now. On titrating 20 Gm. of the contents of each beaker,

No. 1 required 0.5 C.c. of silver solution.
No. 3 " 0.5 C.c. "
No. 2 " 0.7 C.c. "

showing that the most iodine had osmosed in the case of the ointment made with unguentum paraffini (equivalent to vaseline).

Tannate of Quinine—Chininum Tannicum.*

TANNAS Chinini, *Neerl.;* Tannas Quininæ, *Belg.;* Tannate de Quinine, *Gall.*

About: $C_{20}H_{24}N_2O_2, 3C_{14}H_{10}O_9 8H_2O = 1434$ or $C_{40}H_{24}N_2O_4, 3\,C_{28}H_{10}O_{18}. 16\,HO = 1434$

(Aust., Belg., Gall., Germ. I., Graec., Helv., Neerl., Russ.)

Prepared by precipitating a solution of *quinine* with *tannic acid*, washing, and drying at a very gentle heat. The Germ. I., Græc., Helv., Neerl., and Russ. employ the sulphate of quinine; the Belg. and Gall. the acetate; the Aust. gives no formula. The sulphate is dissolved in 20–30 parts of *water* with the aid (of the least possible quantity) of diluted *sulphuric* or *acetic acid*, and the *cold* solution precipitated by aqueous solution of *tannic acid.* 1 part of sulphate requires 2.20 to 2.22 parts of tannic acid, in place of which all the pharmacopœias, with the exception of the Græc., prescribe 3 parts, which is an injurious excess, diminishing the yield by partial resolution of the precipitate. The Græc., which at first directed to obtain the precipitate by simply "adding watery solution of tannic acid," states in the appendix that 2 parts are required for precipitation. The several directions may be classified as follows:

	Quin. Sulph.	Acid.	Dist. water.	Tannic acid.	Dist. water.
Germ. I. Russ.....	1	Ac. Sulph. dil. q. s.....	30	3	30
Græc....	1	Ac. sulph. or acet. dil., q. s.....	20	ab. 2	q. s.
Helv.....	1	Any acid, q.s.	30	3	30
Neerl....	1	0.75 parts ac. sulph., spec. gr. 1.115....	20	3	60

After precipitation the mixture is allowed to stand for a while (in the cold), the precipitate is then collected, washed with small portions of water (carefully, Neerl.), and dried with a *very gentle heat* (without heat, Neerl.).

It is, however, necessary to *hasten* the drying as much as possible, either by soaking the adhering liquid up with blotting paper or porous plates, or by frequent turning, since otherwise the product may easily become mouldy.

The Belg. directs to dissolve pure *quinine*, in a capsule placed on the water bath, in diluted acetic acid of sp. gr. 1.012 to saturation, and, after cooling, to add aqueous solution of tannic acid until nothing more is thrown down. The precipitate is then washed with water and dried.

The Pharm. Gall. directs to mix *hydrate of quinine* with water, to boil and to add *acetic acid* of 50% in such proportion that the quinine dissolves, and the liquid acquires only a very faintly acid reaction. When the liquid has cooled, it is mixed with a cold, filtered solution of *tannic acid*, until the precipitate first formed is completely redissolved. The liquid is now exactly neutralized with *bicarbonate of sodium*, whereupon the tannate of quinine is completely separated. This is then collected on a filter, dried, finely powdered, washed with distilled water, and again dried. It should be amorphous and colorless, and should contain 20–21% of quinine.

According to the other pharmacopœias, tannate of quinine is a yellowish-white or yellowish amorphous powder of a faint (Helv.) peculiar odor (Germ. I.). Its *taste* should be scarcely (Belg.) or but feebly (Neerl.) bitter, more astringent than bitter (Græc.), first astringent, then bitterish (Helv.), astringent and bitter (Aust., Germ. I., Russ.). It is very difficultly soluble in *water;* according to the Russ., in 800 parts of cold and in 30 parts of boiling water. When heated with water, it cakes together (Aust., Germ. I.). It is also soluble in *alcohol* (Græc., Helv.), with difficulty (Germ. I.), easily (Aust. Neerl.); according to the Russ., in 50 parts of cold and in 3 parts of boiling alcohol; also in *glycerin* (Helv.). When gently heated, it melts readily, is decomposed at a stronger heat, and is finally dissipated without residue (Neerl.). The aqueous solution assumes a *bluish-black* color on addition of very dilute solution of a ferric salt. If the preparation is triturated with double the quantity of *oxide of lead* and some water to a fine paste, the latter dried, and extracted with alcohol, on evaporation of the latter, *quinine* will be left behind (Aust.), and may thus be determined qualitatively and quantitatively. The oxide of lead may also be replaced by *caustic lime*, and the quinine extracted with chloroform. The Helv. obtains the same result by triturating 1 part of tannate of quinine with 2 parts of sugar of lead and a little concentrated solution of carbonate of potassium to a paste, digesting this for a few hours, and then exhausting it with strong alcohol.

According to the Russ., the salt consists of 20% quinine, 74% tannic acid, 1% sulphuric acid, and 5% of water. The formula placed at the beginning yields, by calculation, 22.594% quinine, 67.364% tannic acid, and 10.042% of water.

It should be kept in well-closed vessels (Græc., Russ.).

* From Dr. Bruno Hirsch's Universal-Pharmocopöe. See page 160. The abbreviations refer to the national pharmacopœias.

Flueckiger's Method of Opium Assay.

PROF. FLUECKIGER has recently made a report to the Pharmacopœia Committee of the German Pharmaceutical Association, which is printed in the *Archiv der Pharmacie*, and in which the author critically reviews not only his own method previously published, but also those which have since then been advocated or adopted by others (Squibb, Mylius, Van der Burg, the U. S. Pharm., etc.).

In respect to the method prescribed by the U. S. Pharm., Prof. Flückiger remarks that it is quite good, but that, in following its directions, it is scarcely possible to obtain 50 C.c. of filtrate. To obtain this, it is necessary to strongly beat or press the magma of opium upon the filter.

Regarding the so-called lime process, which is also involved in the method of assay given in the U. S. Ph., caustic lime or hydrated lime dissolving the morphine in the opium, and passing together with the morphine into the filtrate, Prof. Flückiger makes the following comments:

"The 'lime-process,' to use this term, has undoubtedly certain advantages. It rapidly brings about a solution of the morphine, and the latter is so completely precipitated from this solution by chloride of ammonium, that the filtrate is not even rendered cloudy by the addition of iodohydrargyrate of potassium.

Of course the quantity of lime really necessary is much smaller than is usually directed to be taken. In one experiment, Prof. Flückiger shook 8 Gm. of opium, of 10% morphine, with 1 Gm. of caustic lime (CaO) and 80 Gm. of water. On the following day he filtered off 42.5 Gm. of filtrate, mixed this with 2 Gm. of chloride of ammonium, and, after the separation of morphine, determined the amount of lime in the filtrate as oxalate. After ignition of the latter, there remained 0.205 CaO. Hence this was the quantity keeping in solution the alkaloid of 4 Gm. of the opium: 100 Gm. of the latter would then have required 5.125 Gm. of caustic lime.

The separation of the morphine, on the addition of the chloride of ammonium to the lime solution, takes place according to the following equation:

$$\underset{\text{lime}}{Ca(OH)_2} + \underset{\substack{\text{chloride}\\\text{ammonium}}}{2NH_4Cl} = \underset{\substack{\text{chloride}\\\text{calcium}}}{CaCl_2} + \underset{\text{water}}{2H_2O} + \underset{\text{ammonia}}{NH_3}$$

Hence, theoretically, 74 parts of hydrated or 56 of caustic lime require 107 of chloride of ammonium. In practice, it is best to use 2 parts of chloride of ammonium for every 1 part of caustic lime, or 1½ parts of hydrated lime.

As a result of his late studies, Prof. Flückiger proposes the following slight modification of his method as given in the text of the German Pharmacopœia, the main object of the change being to insure the removal of the narcotine. He also adds the remark that some authorities condemn the weighing of the morphine while still in the small flask—though this is undoubtedly the most exact method—and prefer instead to weigh it upon a filter, which he does not approve, but is nevertheless compelled to adopt for the present.

Improved Process.—Place 8 Gm. of powdered opium upon a filter of 80 millimeters (3⅛ inch.) diameter, and wash it gradually with 18 Gm. or 25 C.c. of ether, the funnel being kept well covered. Force out the last drops of filtrate by tapping the funnel, dry the opium on a water bath, transfer it to a small flask containing 80 Gm. of water, at 25° C. (59° F.), and shake well repeatedly. After twelve hours, pour the mixture on the previously-used filter, and collect 42.5 Gm. of the filtrate in a small flask, to which add 12 Gm. of alcohol (spec. gr. 0.830), 10 Gm. of ether and 1 Gm. of water of ammonia, stopper well, and set it aside at a temperature of 12° to 15° C. (53°–59° F.) and shake repeatedly. After twenty-four hours, moisten a new tared filter of 80 Mm. diameter with ether, pour upon it the ethereal layer in the flask, add 10 more grammes (14 C.c.) of ether to the latter, and shake well. Again pour the ethereal layer upon the filter. When this has passed, pour the whole contents of the flask upon the filter, and wash the crystals of morphine twice with a mixture of 2 Gm. of diluted alcohol (sp. gr. 1.112), 2 Gm. of water, and 2 Gm. of ether. Dry at a gentle heat, finally at 100° C. (212° F.) and weigh, adding the morphine which may still adhere to the inside of the flask.

Density and Strength of Milk of Lime.

ACCORDING to G. Lunge, the proportion of caustic lime in any given sample of milk of lime—in which all coarse particles have been allowed to settle—may be pretty closely determined with a hydrometer. The following table is given by Lunge:

Degrees Baumé	Spec. Grav.	Caustic Lime (CaO) in 1 liter.	in 100 parts.
1	1.007	7.5 Gm.	0.745 parts.
5	1.037	46 "	4.43 "
10	1.075	94 "	8.74 "
15	1.116	148 "	13.26 "
20	1.162	206 "	17.72 "
25	1.210	268 "	22.15 "
39	1.263	339 "	26.84 "

—*Dingl. Polyt. Journ.*

The Products of Fusel Oil during Acetification.

WHEN alcohol, containing fusel oil, is subjected to the process of acetification, it has been found that the fusel oil is changed to acetate of amyl, which, having a fruity odor ("pear-essence") contributes to the aroma of the vinegar.—*Chem. Centralbl.*

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EDITORIAL.

PROF. JOHNSTON'S paper on photography, a continuation of which appears with this number, should suggest to some of our readers the sale of photographic chemicals and other materials as a feature of their business which may prove remunerative.

There are already amateur photographers in nearly every community, the number is rapidly increasing, and there is no good reason why they should go to stationers, opticians, or dealers in photographic goods exclusively for oxalate of potassium, sulphate of iron, bromide of potassium, nitrate of silver, alum, hyposulphite of sodium, pyrogallic acid, water of ammonia, etc., when they are all to be found in any drug-store.

It involves but small outlay of space or money to keep a stock of dry-plates and the necessary apparatus for developing negatives and making prints, and it might pay to keep in stock and ready-made, developing and toning solutions.

Besides the mere focusing of a camera and exposing a plate, the manipulations of photography are almost entirely chemical, and besides the practical photographer, no one is better fitted than a pharmacist to act as an expert adviser for the amateur, whose experience has not yet taught him how to overcome the technicalities of the art of picture-taking.

In some localities, it might even be advisable to stimulate business by a judicious display of photographic materials, including amateur outfits.

THE National Retail Druggists' Association seems to have practically come to an end. A small membership survives the second year of existence, but it is far too small to justify the continuance of the organization unless the ingenuity of its promotors can suggest some object to be accomplished which can be better achieved through national than by local association. The history of the "Campion Plan" suggests that even questions of such importance to the retail trade of the whole country can be handled by small and local bodies with better results than by the unwieldy efforts of a national convention. For all purposes it will be found that a thorough organization of the trade in the form of small, local associations will accomplish more, and prove far more satisfactory than an association which aims at enrolling in its membership thousands who, in the nature of things, can never attend its meetings, nor participate directly in its work. When co-operation becomes desirable, such local associations can readily secure concert of action through a State convention of delegates, and each State convention can as readily be represented in a national body similarly constituted.

IT is worthy of consideration by State pharmaceutical associations already in existence, whether the welfare of the profession would not be promoted by abolishing the system of permanent membership and, instead, of adopting the plan of representation by delegates elected for a term of years by local organizations. This would do more than anything else can do to stimulate local organization, and would make every State association an *active* association. There would be fewer persons connected with these bodies whose activity is limited to the payment of dues, and it would, at all times, represent the current opinions and wishes of the trade. Another advantage to be derived from such a plan of organization would be the difficulties it would oppose to the establishment of a clique of managers. In few instances, indeed, do persons who wield a controlling influence in such organizations make unfair use of their opportunities for personal ends, while, on the other hand, the instances are common in which both time and money are cheerfully given to secure the accomplishment of measures calculated for the good of all. Nevertheless, it is a fact that the existence of a permanent membership does result, in most organizations, in a few persons, comparatively, doing work which should be shared in by many, and in time it leads to the establishment of precedents which interfere more or less with the main purposes of the organization.

THE present state of the affairs of the N. R. D. A. should serve to point out to the American Pharmaceutical Association its opportunity for advancing the interests of pharmacy generally. Had there existed in the composition of the more scientific body some provision for discussion and action upon matters that are purely questions of trade policy, the former association would, probably, never have come into existence. There are now many reasons why it may be desirable to provide for the consideration of such topics as they may from time to time be presented, even if it involve the addition of another day to the session or greater attention to economy of time by condensing certain reports into abstracts to be presented at the meeting, while the detailed reports may be postponed for official publication.

There is no good reason why pharmacists should have separate organizations for considering trade interests independently of other matters of a more professional nature, and the truth of this has been sufficiently demonstrated during past two years by the appointment of nearly the same persons as representatives in the A. P. A., and the N. R. D. A., and the coincidence of time and place of meeting for both bodies.

Mr. Henry Betts Parsons, well known throughout the profession as a skilled pharmacist and chemist, an able writer, and as one of the champions of advanced pharmaceutical education, has lately been deservedly honored by the University of Michigan conferring upon him the honorary degree of Master of Pharmacy.

Obtaining Iodine in Peru.

ACCORDING to the *Génie civil*, 1884, 5, 106, about 1,600 kilos of iodine are produced monthly at the works of Peruana, in the province of Tarapaca, in Peru, from the iodous mother-liquors obtained in the manufacture of sodium nitrate. The forms of apparatus constructed by R. Harvey and J. T. North, in 1881, are employed for the preparation of the hydrogen sodium sulphite used to precipitate the iodine, and for distilling the latter. The hydrogen sodium sulphite is obtained by saturating a solution of soda with sulphurous anhydride. The soda is prepared by furnacing an intimate mixture of sodium nitrate and coal-dust. The essential constituent of the product of the reaction is soda contaminated with sodium chloride, sodium sulphate, earthy ingredients, and unburnt coal.—*Dingl. Polyt. Journ.*

New Method of Administering Pepsin.

DR. PROSSER JAMES, in the *Brit. Med. Journ.*, describes a combination of pepsin with salt which he has devised in order to secure the pepsin being taken at the time it is required, that is, with the food on which it is to act. A simple mixture of pepsin with salt may be successfully employed as a digestive condiment, provided it be freshly prepared each time; for such a mixture, if kept, is apt to decompose, and the patient who has once observed this will take no more of the putrefying powder. To overcome this difficulty, the doctor says the pepsin and the chloride must be brought together in such a way that possibly a compound, or peptochloride may be formed. Whether such union occur or not, a powder thus prepared is quite stable.—*Chem. and Drug.*

Cyanide of Gold and Potassium

Is employed by Dr. Galezowski, in form of hypodermic injection, in cases of ataxic papillary atrophy. The dose is 5 milligrammes (about $\frac{1}{12}$ grain) at first, and afterwards 10 milligrammes (about $\frac{1}{6}$ grain) every day or every two days. The solution should be freshly prepared, and with great care, a good proportion being:

	Gm.	
Cyanide of Gold and Potassium.....	0.10	1.6 gr.
Distilled Water.	10.00	160 min.

8 minims = 5 milligrammes. —*Journ. de Pharm. et Chim.*

Remarks on the Construction of Chemical Equations.

IT seems a matter of regret that in most, if not all, of our text-books on chemistry the principles of the method of expressing chemical changes by the arrangement of symbols called (from algebraic analogies) an "equation," are either omitted altogether or very imperfectly and cursorily explained. In the more advanced text-books such elementary knowledge appears to be assumed, while in the elementary treatises it is not given. After a description of some experiment or reaction, the student is generally abruptly told that "the change may be represented by the following equation;" and then follows the cut-and-dried line of formulæ, with little or no explanation as to what the signs connecting the formulæ really mean, and why certain "coefficients," and not larger or smaller ones, are prefixed to the formulæ.

I do not attach an excessive value to symbolic representations of chemical changes, nor do I think it right to plunge a beginner into a maze of formulæ before he has made such progress in practical work as to feel the want of some short and significant method of expressing the results of his experiments, and to be able to appreciate rightly and fully the grounds on which certain symbols, having exact reference to weight and volume, have been chosen to represent the substances he has dealt with. I should rather consider that the atomic theory is best introduced after the student has become familiar with the series of nitrogen oxides, and with ethylene and methane, the consideration of which led Dalton to propose the theory, and to invent the system of symbols for the direct purpose of expressing his chemical atoms. Such series, together with the elements hydrogen, oxygen, and nitrogen, which would have been previously studied, afford valuable illustrations of Avogadro's law, and lead up to the conception of molecules as distinguished from atoms, the development of which will probably render the chemistry of the future little more than a branch of physics.

I do not, however, intend here to sketch out a course of chemical work, but simply to urge the desirability of fuller and more exact explanations of the system of symbols and equations than are usually given. In furtherance of this object, I should like to submit the following observations, apologizing at the same time for their elementary character.

1. A chemical change consists in a molecular action of such a kind as to cause a re-arrangement of the atoms of the substances which take part in it, with formation of new molecules differing in properties from the original ones.

2. In the quantities of substances taken for practical experiments many millions of molecules must take part in the change; but we can express the result quite accurately by stating what occurs in the case of the *smallest* number of molecules that can take part in the action at all. Thus, when we mix 1 C.c. of oxygen gas with 2 C.c. of hydrogen gas, and cause combination to take place, it is sufficient to consider the action that occurs between one molecule of oxygen and two molecules of hydrogen, there being sufficient grounds for believing that the same action is going on between every other molecule of oxygen and pair of molecules of hydrogen in the whole mass of the mixed gases.

3. In expressing a chemical change by symbols, then, we proceed in the following way:

Given—

1st. The qualitative results of the action, *i. e.*, a knowledge of all the substances which take part in it and are produced by it.

2d. The fact that no weight is lost or gained in the action.

3d. The correct formulæ of the molecules of all the substances concerned in it.

We place the formulæ of the original molecules as the factors on the left-hand side of an equation, and the formulæ of the new molecules on the right-hand side; and we choose as coefficients for these factors the *smallest* whole numbers which will satisfy the equation. These coefficients, although often obtainable by mere inspection and common sense, and generally in text-books put thus before learners in a rather haphazard way, can be best determined by the usual algebraic methods for solving simultaneous equations.

Thus we may put $a, b, c \ldots$ for the coefficients on one side of the equation and $p, q, r \ldots$ for those on the other side, and adopt their minimum integral values (since *less* than one molecule cannot be dealt with), in constructing the complete equation for expressing the chemical change.

The following may serve as a simple example: In the action of copper on hydrogen nitrate, it is known that under definite conditions nothing but copper nitrate, nitrogen dioxide, and water are produced. Hence we have:

$$a\mathrm{HNO_3} + b\mathrm{Cu} = p\mathrm{CuN_2O_6} + q\mathrm{N_2O_2} + r\mathrm{H_2O}.$$

Now if we consider how the atoms to which a refers are distributed in the new molecules expressed by the formulæ on the right-hand side of the equation, we find:

With regard to the
Hydrogen atom, $a = 2r$ (i.)
Nitrogen atom, $a = 2p + 2q$ (ii.)
Oxygen atom, $3a = 6p + 2q + r$ (iii.)
Copper atom, $b = p$,

Eliminating q and r,

$$\text{From (i.)}, \quad r = \frac{a}{2}$$

$$\text{From (ii.)}, \quad q = 2\frac{a - 2p}{2}$$

Substituting these values in (iii.)—

$$3a = 6p + 2\,\frac{a - 2p}{2} + \frac{a}{2}$$

$$6a = 12p + 2(a - 2p) + a.$$
$$= (12 + 4)p + 3a$$

Hence $(6 - 3)a = 8p$, $\therefore\ 3a = 8p$,
and $p = \frac{3}{8}a$.

Again, from (ii) —
$$2q = a - 2(\tfrac{3}{8}a) = (1 - \tfrac{6}{8})a = \tfrac{1}{4}a.$$
$$\therefore\ q = \tfrac{1}{8}a.$$

And from (i.), $r = \frac{1}{2}a$.

Hence, taking $a = 8$ a minimum integral value,
$b = 3$
$p = 3$
$q = 1$
$r = 4$

Substituting these values in the chemical equation, we get—

$$8\mathrm{HNO_3} + 3\mathrm{Cu} = 3\mathrm{CuN_2O_6} + \mathrm{N_2O_2} + 4\mathrm{H_2O}.$$

Again, in the preparation of nitrogen dioxide by Pelouze's method, it is known that the only substances required for the reaction are iron protosulphate, potassium nitrate, and hydrogen sulphate; and that the only substances produced are iron persulphate, potassium hydrogen sulphate, nitrogen dioxide, and water.

Hence,—

$$a\mathrm{FeSO_4} + b\mathrm{KNO_3} + c\mathrm{H_2SO_4} = p\mathrm{Fe_2(SO_4)_3} + q\mathrm{KHSO_4} + r\mathrm{N_2O_2} + s\mathrm{H_2O}.$$

Then with regard to the,—

Iron atom, $a = 2p$ (i.)
Sulphur atom, $a + c = 3p + q$ (ii.)
Oxygen atom, $4a + 3b + 4c = 12p + 4q + 2r + s$ (iii.)
Potassium atom, $b = q$ (iv.)
Nitrogen atom, $b = 2r$ (v.)
Hydrogen atom, $2c = q + 2s$ (vi.)

From (i.) we have $p = \frac{1}{2}a$.
" (iv.) " $q = b$.
" (iv.) and (v.) $2r = b$ $\therefore\ 2r = q$.
" (vi.) $\frac{1}{2}q + s = c$.

Substituting these values in (iii.),—

$$4a + 3q + 2q + 4s = 6a + 4q + q + s.$$

Whence, $3s = 2a$, and $s = \frac{2}{3}a$....(vii.)

Substituting these values of c, p, and s in (ii.),

$$a + \tfrac{1}{2}q + \tfrac{2}{3}a = \tfrac{1}{2}a + q.$$

Whence, $\frac{1}{6}a = \frac{1}{2}q$, and $q = \frac{1}{3}a$.....(viii.

Substituting the values of q and s in (vi.),

$$2c = \tfrac{1}{3}a + \tfrac{1}{3}a, \text{ and } c = \tfrac{2}{3}a....(ix.)$$

Thus we have:

From (iv.) and (viii.), $b = \frac{1}{3}a$.
" (ix.) $c = \frac{2}{3}a$.
" (i.) $p = \frac{1}{2}a$.
" (viii.) $q = \frac{1}{3}a$.
" (iv.) and (v.) $r = \frac{1}{6}a$.
" (vii.) $s = \frac{2}{3}a$.

Whence, taking $a = 6$, as minimum integral value:

$b = 2$ $q = 2$
$c = 5$ $r = 1$
$p = 3$ $s = 4$

Substituting these values in the chemical equation, we get,—

$$6\mathrm{FeSO_4} + \mathrm{KNO_3} + 5\mathrm{H_2SO_4} = 3\mathrm{Fe_2(SO_4)_3} + 2\mathrm{KHSO_4} + \mathrm{N_2O_2} + 4\mathrm{H_2O}.$$

Possibly such calculations (although extremely easy) will not in all cases take a shorter time than the haphazard common-sense method usually adopted; but I think that it is at any rate worth while to draw attention to the real principles involved in the construction of chemical equations.—H. G. MADAN in *Chem and Drugg.*, June 5th.

Note by Ed. Am. Drugg.—To recapitulate, for the benefit of the younger readers, the method here described enables one to ascertain the lowest number of molecules entering into a reaction, provided the following conditions are fulfilled:

1. *All* the substances reacting and *all* the substances produced must be known.

2. Their correct chemical formulæ must be written down.

Each separate constituent of the reaction is designated by a letter, and this letter is referred to each element entering into the molecule of this constituent, for the purpose of forming an equation which shall express how many times, and under which of the letters, this element occurs on each side of the original equation. The calculation is then performed in the usual manner. For instance, when chlorine acts on hydrate of potassium, under certain conditions, there is produced chloride, chlorate of potassium and water.

$$a\mathrm{KOH} + b\mathrm{Cl} = p\mathrm{KCl} + q\mathrm{KClO_3} + r\mathrm{H_2O}$$

Then we have:

for K : $a = p + q$ I.
for O : $a = 3q + r$ II.
for H : $a = 2r$ III.
for Cl : $b = p + q$ IV.

To save time, one of the unknown quantities (best that which occurs most frequently in the equations) may at once be replaced by some definite number, say 1, or, to avoid too many fractions, 12 or 24, etc.

Let us put $a = 12$ V.

Then from III. it follows that:

$12 = 2r$
$6 = r$ VI.

From I+IV we have $a = b$
From V. $12 = b$ VII.

Substituting the values found in eq. II., we have:

$12 = 3q + 6$
$6 = 3q$ VIII.
$2 = q$

Finally, substituting in IV.

$$12 = p+2$$
$$10 = p \qquad \text{IX.}$$

It will be seen that the values found —12, 12, 10, 2, 6—may be reduced to the more simple figures, 6, 6, 5, 1, 3. We therefore substitute these in the reaction:

$$6\,KOH + 6\,Cl = 5\,KCl + KClO_3 + 3\,H_2O$$

One more example: When nitric acid acts upon cupric sulphide, there is produced cupric nitrate, sulphur, water, and nitric oxide:

$$a\,CuS + b\,HNO_3 = p\,Cu(NO_3)_2 + q\,S + r\,H_2O + s\,NO$$

Then we have:

for Cu	:	a	= p	I.
for S	:	a	= q	II.
for H	:	b	= $2r$	III.
for N	:	b	= $2p+s$	IV.
for O	:	$3b$	= $6p+r+s$	V.

Let us put $b = 24$.

Then from eq. III. we have:

$$24 = 2r$$
$$12 = r$$

Multiplying eq. IV. with 3, and then combining eq. IV. and V., we have:

$$6p+3s = 6p+r+s$$
$$2s = r$$
$$2s = 12$$
$$s = 6$$

Substituting in eq. IV., we have:

$$24 = 2p + 6$$
$$18 = 2p$$
$$9 = p$$

Substituting in eq. I., we obtain:

$$a = 9$$

and, since $q = p$ (eq. I. and II.), it follows that:

$$q = 9$$

The values found for the unknown quantities:

a	b	p	q	r	s
9	24	9	9	12	6

may be reduced to simpler figures by dividing with 3. We therefore write the reaction thus:

$$3\,CuS + 8\,HNO_3 = 3\,Cu(NO_3)_2 + 3\,S + 4\,H_2O + 2\,NO.$$

A New, Very Delicate Indicator for Alkalies.

THEODOR LEHMANN and JULIUS PETRIE have published the results of some studies and observations made with a coloring matter originally obtained by Liebermann from phenol. This is produced by the action of concentrated sulphuric acid, in presence of a nitrite, upon phenol, and appears in form of red-brown, amorphous flakes, soluble with yellow color in various neutral solvents, and in concentrated sulphuric acid with dark blueish-green color. A spectroscopic examination led the authors to suspect that this coloring matter was not a single chemical individual, but contained a second coloring substance which appeared to have great resemblance to litmus. It is reddened by acids and rendered blue by alkalies, the transition being extremely sharp and sudden, and taking place even in the most dilute solutions. This coloring matter is prepared in the following manner:

Mix 5 C.c. of phenol with 5 C.c. of concentrated sulphuric acid, keeping the mixture cool, and then add, in drops, 20 C.c. of nitrosyl-sulphuric acid (prepared by dissolving 5 parts of nitrite of potassium in 100 parts of cold, concentrated sulphuric acid). When all is added, heat the mixture on a water bath to 80° C. (176° F.) until the mass has a dark violet-blue color, and until a sample, taken out and mixed with enough concentrated sulphuric acid to form a transparent mixture, ceases to possess the characteristic spectrum of Liebermann's coloring matter (see below), but shows a clear absortion-band from B ½ C to D ½ E, the color being pure blue in proper dilution.

[Liebermann's coloring matter behaves as follows, if used in solution which is just dilute enough to be transparent. A faint ray of light is visible at E. Next the green becomes visible, while red and yellow are absorbed in tolerably sharp definition up to D ½ E. From E ½ F the absorption progresses less suddenly, but is not so intense in the blue portion, so that a little blue light passes through. But no isolated band makes its appearance.]

When this point has been reached, the mixture is poured into about 2 liters of cold water, when the coloring matter will separate in form of a dark-violet, amorphous substance. This is collected on a filter, washed until all traces of sulphuric acid have disappeared, and dried at 100° C. (212° F.). The dry residue is dissolved in ether, and the filtered solution deprived of ether by distillation, when the pure coloring matter will remain behind.

Thus prepared, it is easily soluble in acetone, ether, ethylic, methylic, and amylic alcohol with yellow color; less easily soluble in chloroform, difficultly so in benzol and toluol, insoluble in petroleum ether and ligroin. Concentrated sulphuric acid dissolves it with a pure blue color. On diluting this solution with a little water, or on dissolving the coloring matter in fuming hydrochloric acid, a yellowish-red liquid results. [In the case of Liebermann's coloring matter, it is cherry-red. Under all conditions, except that mentioned above (concentrated sulphuric acid), the new coloring matter turns red with acids and blue with alkalies.]

This new indicator—which has no name as yet—is far more delicate even than phenolphthalein. As an instance, the authors quote this fact. 50 C.c. of water deprived of carbonic acid were mixed with a few drops of alcoholic phenolphthalein solution, and then titrated with $\frac{1}{100}$ normal soda solution. It required 0.5 C.c. to produce a permanent reddening. On repeating the experiment with the new indicator, only *two drops* of the soda solution were required to produce a blue color.

The new indicator shares with phenolphthalein the property that it is not indifferent towards carbonic acid, and is unreliable in presence of ammonia. But it is the best indicator so far known, according to the authors, for testing other alkalies, and all the alkaline earths, all mineral acids, and such organic acids as are usually determined volumetrically.—After *Arch. d. Pharm.*, 1885 [3], 23, 243.

The Quinine Outlook and Cinchona Prospects.

THE following views in regard to the future of the bark market have been written for us by an eminent authority. They are to be taken only for what they are worth, but evidently they present an intelligent idea of the conditions which now regulate the prices of cinchona:

The future of the quinine industry has of late given rise to a great deal of theoretical speculation; but those who have considered the question attentively in all its relations now believe that the trade in quinine and the cinchona alkaloids generally is about to take a new and vigorous departure, quite distinct in its aims and results from the path pursued in past times. There are and have been in operation for some time elements which have a most important bearing on the article, and will eventuallly abolish the violent and constant fluctuations attending its sale.

As long as manufacturers were dependent on South America for their supplies of bark, a large field was left open to speculation. The principal cause of upward movements was the unsteady political condition of the South American Republics, which furnished the supplies. The high price of labor and the great difficulty and delay attending transportation in those countries also played their part. Against these, operating for a decline, were the discovery of new forests; for instance, those of New Granada, which in eight years supplied a total of 100,000 bales of cinchona, most of which was rich in alkaloids. At first this bark arrived in quantity, but gradually declined, and by the end of 1879 ceased entirely. In the beginning of 1880 the cuprea bark first appeared in the market, and in three years yielded 200,000 bales. This state of affairs is now changed, the South American barks being nearly altogether replaced by the East Indian kinds, which arrive in such large quantities that they alone would now nearly supply the total world's consumption. Their arrivals are regularly on the increase, and if the supply from this source should not be sufficient to cover requirements, the old stock remaining of South American can be utilized, and will certainly be more than sufficient to meet any deficiency that may arise for several years to come, or, in fact, till the arrivals of East Indian barks alone will unquestionably suffice to meet all demands. It has constantly been asserted that the shipments of Ceylon bark will decrease, and that the cultivation in most districts was not found profitable. The best answer to this is found in a constant increase of arrivals, these showing an advance of about 50 per cent since October 1st, 1884, to the present, compared with the same period in previous year. There is another important point to be noted in connection with this bark, and one generally overlooked. The percentage of quinine in the bark has been steadily increasing each year. There is, therefore, not only a larger and steady supply of bark available, but the actual yield of alkaloids from it is constantly improving, while the expense of cultivation remains the same, for the plantation costs just as much to work, whether the bark is rich in quinine or not. In the East labor is very cheap, and cost of transportation, especially in the case of Ceylon, trifling; everything therefore seems favorable for the cheap production of quinine-producing barks. It has not transpired what the actual cost price of Ceylon cinchona bark is, but there is one consideration which may throw some light on it. The twig bark which is sold in London at from 1½*d.* to 2*d.* per lb. arrived in a quantity twice as great since October last as in the same period of the years 1883-84. It may be believed that, at the prices named, this, so to speak by-product of the plantations, pays its own expenses of cultivation, collection, freight, etc.; for if it did not pay its own expenses and cost of cultivating it would probably cease to come forward. This leaves the stem bark, which averages 2 per cent of quinine and is worth 4*d.* per unit, or about 8*d.* per lb., to cost about the same as the twigs. In any case a handsome margin of profit must be left, even after a liberal deduction for general expenses, interest on capital, etc. Looking at the result of the last few years, there is every reason to suppose that the production will continue to increase.

It has been suggested that South America may again come to the front in supplying the world. It is, however, highly improbable that new forests, easy of access, and admitting of being worked cheaply, will be discovered; while the new plantations in Bolivia are yet in their infancy, and the cultivation was not carried on in a proper manner at first, and in any case it will be more expensive and cost much more for transportation than the Eastern barks.

The price will no doubt be regulated in future by the East Indian supplies.

These are now looked upon as staple products of the countries where the plantations are situated; it is natural to suppose that improvements will continue to take place in the cultivation, and eventually a regular crop may be expected with certainty—of course subject to slight annual variations as other crops are.

This will insure a steady market for the bark, and, as a consequence, quinine makers will have to be content with a narrow but steady rate of profit, such as is yielded by other manufacturing industries. The consumption will increase with low prices, but the increase in richness of the bark will probably more than counterbalance this.—*Chem. and Drugg.*

Testing Commercial Quinine for Cinchonidine.

BY DR. J. E. DE VRIJ.

ALTHOUGH the estimation of real quinine present in the commercial article may readily be accomplished, either by means of Laurent's polariscope or by converting it into herapathite, still the execution of either of these methods, in the ordinary drug-stores, is impracticable. On the one hand, the apparatus of Laurent is too expensive, and the determination as herapathite requires a preliminary experience which is possessed by but few. While I have been assured, for instance, by Mr. Nayler, of London, that he performs every week about a dozen herapathite determinations with good results, this method has recently been condemned by Shimoyana as unreliable. I propose to take up this question in the future. For the present I will only say that this method really furnishes good results, and that failures should be ascribed only to want of experience.

I have always considered it desirable to find a method which would enable the apothecary to readily determine the presence of sulphate of cinchonidine in commercial sulphate of quinine; and I have finally succeeded in discovering a very simple method, for which nothing else is required than normal sulphuric acid (containing one-half the molecular weight in grammes, or 49 Gm. of sulphuric acid, H_2SO_4 in 1 liter), caustic soda, and ether. It is further necessary, however when comparing different samples of sulphate of quinine, always to operate under the same conditions.

The Netherlands Pharmacopœia requires that when 1 part of sulphate of quinine is gently shaken with 20 parts of ether and 2 parts of water of ammonia, two perfectly clear layers of liquid should be formed. This condition, however, is, in my experience, even fulfilled by a sulphate of quinine containing *as much* as 18% of sulphate of cinchonidine, making the test nugatory. My new method depends upon the fact that *acid sulphate* of quinine is easily crystallizable, both from water and from alcohol, while acid sulphate of cinchonidine is uncrystallizable from water, being very soluble in this liquid. Hence, if a mixture of both sulphates is dissolved by a *small* quantity of water, with aid of a gentle heat, a large portion of the quinine salt will separate again, on cooling, in form of crystals, while the remainder of it, together with the cinchonidine salt, will remain in solution. The application of this fact to the test in question is made as follows:

Dissolve 5 Gm. of the sulphate of quinine to be examined in 11 cubic centimeters of normal sulphuric acid, heating to about 60° C. (140° F.). Set the clear solution aside to cool. After twelve hours a large proportion of the quinine will have separated as crystallized acid sulphate, which may, of course, be utilized as such, after being removed and dried, so that there is but little loss of material. Pour the mother-liquid off the crystals as completely as possible, and shake it with some soda solution and 25 Gm. of ether. This causes the separation of a large proportion of the cinchonidine in small crystals floating upon the surface of the alkaline layer. If the quantity of separated cinchonidine is at all considerable, it may be collected and weighed.

On applying this method to a sulphate of quinine, which when tested optically (in form of tartrate), showed 13.2 per cent of sulphate of cinchonidine, I obtained 0.45 Gm. of this latter salt, equal to 9 per cent. And on applying it to an exceptional sulphate of quinine, which had been sent to me by a foreign manufacturer for examination, and which contained only 2.403 per cent of sulphate of cinchonidine, I still obtained—in spite of the small quantity—a separation of crystals visible with the naked eye, though so small as to forbid weighing.

This method may be made still more exact in the following manner. Take the capsule, into which the 5 Gm. of sulphate of quinine with the 11 C.c. of normal sulphuric acid are introduced, and warm it on a water-bath until the liquid becomes covered with a crystalline scum. Then let the capsule become cold, and bring it back to its original weight by adding distilled water. Remove the mother-liquid as thoroughly as possible, and treat it with soda and ether. When examining a number of different samples, it is necessary to operate upon equal quantities of mother-liquid with equal amounts of soda and ether. It will then be possible to recognize the presence of cinchonidine under all circumstances with the naked eye, and in many cases it may even be weighed, besides.

If, in addition to the above test, the quantity of tartrate is determined, which may be obtained from the quinine in question—and this varies, in the commercial sulphates of quinine [of Europe, we presume] between 90 and 93%—all data will be available for determining the value of the samples in question.—*Nieuw Tijdschr. v. d. Pharm.*, 1885, 100.

Testing for Arsenic.

VARIOUS governments have prescribed the method by which the presence of arsenic in certain articles of public comfort or use (wall-papers, etc.) is to be determined, and some of them even have established an upper limit which the arsenic under no circumstances must exceed. It happens, however, that this limit and the method of testing do not always agree, inasmuch as a very careful and expert operator will often obtain from an article far exceeding the established limit the full amount, or at least so much of the arsenic as will condemn the article, while a less skilled operator, though literally carrying out the process, will find less than the limit, and hence pass the article as salable. This discrepancy appears to have recently been noticed in Sweden, and a remedy for its avoidance has been proposed by Mr. Albert Atterberg, which will be given below.

The usual method by which arsenic is now tested for in nearly all laboratories is as follows:

1. *Preliminary Test.*—A piece of the suspected substance is put into a long test-tube with some metallic zinc and ferrous sulphate, and hydrochloric acid poured on top. Into the upper part of the test-tube a pellet of cotton saturated with alkaline acetate-of-lead solution is inserted, and the mouth of the test-tube is loosely stoppered with a cork, bearing in two notches on its inner face, strips of paper, moistened respectively with solution of acetate of lead and of nitrate of silver. If the silver paper has not acquired a blackish or black color within twelve hours, arsenic may be assumed to be absent.

In practice, this preliminary test is often omitted. But if carefully executed, it often makes further testing unnecessary.

2. *Principal Test.*—The suspected substance is put into a flask with very long neck and placed in an oblique position, together with 1 to 2 Gm. of ferrous sulphate and hydrochloric acid of 1.190 spec. grav., and the mixture distilled. The flask is connected with a perpendicularly placed pipette, the point of which just dips below the surface of 200 cubic centimeters of water contained in a glass flask. As soon as the pipette becomes hot, the distillation is terminated.

If bronze colors occur in the suspected substance, they are brought in solution by the addition of a few grammes of solid ferric chloride.

If sulphide of arsenic was present, this becomes decomposed under the above circumstances and the arsenic distils over.

The obtained distillate is now tested as stated above under No. 1—10 C.c. being taken for a test. If arsenic is found to be present, the bulk of the distillate is saturated with hydrogen sulphide water, and after twenty-four hours, passed through a very small filter. The latter is washed with hydrogen sulphide water, and then treated for several hours with dilute ammonia—the neck of the funnel being meanwhile stoppered. The filtrate, together with the wash-water, is evaporated to dryness, the residue moistened with a little soda solution, and dried again. The dry residue is now mixed with a thoroughly dry mixture of cyanide of potassium and carbonate of sodium, and then examined by Fresenius and Babo's method—heating in a very slow and uniform current of dry carbonic acid gas, when a more or less strong arsenical mirror will be obtained if arsenic was present.

Atterberg now proposes to simplify this method in the following manner:

After the distillation has been completed, as described under 2, the distillate is mixed with nitric acid and evaporated to dryness. If arsenic was present, the whole of this remains in the residue as arsenic acid. The latter is at once recognized by dissolving the residue in water and adding nitrate of silver. If a precipitate of arseniate of silver does not occur immediately, the whole is again evaporated to dryness, when, if arsenic was present, the characteristic color of arseniate of silver will appear quite sharply.

In case organic substances should have passed into the distillate, the arsenic residue may contain oxidation products, such as oxalic acid. And if sulphur had passed into the distillate, the residue may contain sulphuric acid. These substances, however, do not interfere with the silver reaction, provided enough silver nitrate is added so that, on drying, the foreign acids are all combined with silver.—*Rep. d. Anal. Chem.*, 1885, No. 12.

Pill Excipient.

IN a short note addressed to the *Pharm. Journ.*, Mr. J. F. Brown states that he finds glucose too sticky a pill excipient, when used alone. He prefers a mixture of

Glucose..... 12	parts.
Glycerin 4	"
Water 1	part.

which answers for many purposes.

He recommends to drop this excipient by means of a drop bottle made from a thistle-head safety funnel, fitted with a cork, into a 6 or 8 oz. squat bottle, and having a piece of thin sheet rubber tied firmly over the top.

Doundake Barks.

MR. THOMAS CHRISTY, F.L.S., in No. 8 of his *New Commercial Plants and Drugs*, gives the following account of these barks (compare also AM. DRUG., 1884, p. 74):

Under this name, several barks derived from the west coast of Africa have been examined in France. One of these is identical with the bark of the root which I received in 1878 from Liberia, under the name of peach root (see "New Commercial Plants," No. 2, p. 14), and which is obtained from *Sarcocephalus esculentus* Afz., a plant belonging to the cinchona family. MM. Heckel and Schlagdenhauffen consider it to be capable of replacing cinchona bark as an astringent and febrifuge, and also regard the beautiful yellow coloring-matter contained in the bark as worthy the attention of dyers. According to these chemists, the doundake plant is found from 16° N. latitude to 5° S. latitude, from Senegambia to the Gaboon, and is known in the Sonson tongue as "dundaké," in the Toucouleur as "jadali," in the Bassa country as "dorg," and in Sierra Leone as "amelliky." They also state that the bark of certain species of *Morinda* is sometimes mixed with the doundaké bark, viz., *Morinda citrifolia*, L., *Morinda longiflora* G. Don., and a third, which has been named *Morinda Doundaké* Heckel, although Professor Oliver considers it to be only a variety of *M. longiflora* ("Flora Trop. Africa," III., p. 193). They notice certain distinctive features between the doundaké bark from Sierra Leone and that from Rio Nunez, but only such as indicated that the bark may be derived from different varieties of the same species, or of the same plant growing under different conditions.

That from Sierra Leone has a grayish, smooth surface, cracked here and there, and presenting small, hard excrescences of a darker color. When older, the bark becomes blackish, the cracks multiply, and the epidermis falls off as a reddish dust. The interior of the bark is of an ochrey-yellow, and is striated longitudinally. The liber fibres separate easily in lamellæ. The bark has a bitter taste, and when chewed, gives a yellow tinge to the saliva. The corky layer and epidermis are simply astringent. The bark from Rio Nunez is similar, but has no blackish excrescences, and the internal surface is darker yellow, the liber is more bitter, and the epidermal layer less astringent, but the anatomical structure is identical. The bitter taste is due to two nitrogenous principles of a resinoid character, which differ in their solubility in alcohol, and have the respective formulæ $C_{28}H_{19}NO_{12}$ and $C_{19}H_{15}NO_9$. The bark also contains a tasteless crystalline principle soluble in caustic potash, glucose, and traces of tannin. This doundaké is evidently not identical with that examined by MM. Bochefontaine, Feris, and Marcus, since MM. Heckel and Schlagdenhauffen could not find any trace of the poisonous alkaloid found by the former in the doundaké bark they had examined (*Comptes Rendus*, XCVIII., p. 272), although it was obtained from Rio Nunez. The bark examined by the former is described as being of an *orange-red* color, formed of superimposed lamellæ, which are easily detached from one another, and the taste as powerfully bitter. The active principle, doundakine, possesses an alkaline reaction and the same physiological action as the bark itself. It produces in the frog and guinea pig a cataleptic state, with gradual failure of the respiration, and then of the heart's action. In dogs, the cataleptic action is not evident. A poison used in the chase by the natives produces similar effects, which is believed to be due to the doundaké being employed in its manufacture. It is most unfortunate that the same name should be applied to barks possessing such different properties. It is better, therefore, to retain the name of African peach root for the tonic and febrifuge bark of Sarcocephalus esculentus, and reserve the name of doundaké for the bark first described under that name by MM. Bochefontaine, Feris, and Marcus, and which, judging from its physiological action, is probably derived from some apocynaceous or loganiaceous tree, nearly allied to Geissospermum. Having sent out to the west coast of Africa for a large supply of doundaké bark (Sarcocephalus), I was surprised to receive yet another kind, also known under the name of doundaké, in the neighborhood of Sierra Leone. It occurred in long, thin pieces of a yellowish-brown color externally, lighter internally, with a slightly bitter taste. I sent a sample to Dr. Heckel, who at once identified it as that of the *Cochlospermum tinctorium* (see Perrottet's "Flora Senegambiæ").

In reviewing the results obtained by MM. Heckel and Schlagdenhauffen, the editor of the *British and Colonial Druggist* asked what advantage doundaké possessed over Berberis vulgaris; the following translation of the reply which I received from Dr. Heckel and sent to the editor, will prove interesting:

"Doundakine, which is obtained from the bark of the *Sarcocephalus esculentus*, possesses far more powerfully febrifuge and sedative properties than berberine or oxyacanthine, which are present in the root of the spine Vinette (*Berberis vulgaris*). Again, the coloring matter of doundaké is of the old gold color, so much sought after for dyeing silks, whilst berberis root gives a pale yellowish tint, without brightness or value."

I have now a supply of doundakine under preparation, and hope that it may be tested in this country, both therapeutically and commercially.

German Analyses of English and American Meat Extracts.

A. STUTZER, of Bonn, has published in the *Berliner Med Wochenschr.* for April 15th, the results of an examination of nine preparations, including Murdock's liquid food, Valentine's meat juice, Johnston's fluid beef, Benger's peptonized beef jelly, Savory & Moore's fluid beef, Brand & Co.'s essence of beef, Reed & Carnrick's beef peptonoids, and Kemmerich's and Liebig's beef extracts, the first four being American, the next three English, and the last two German.

He first determined in each the proportion of organic matter, salts, and water, and then further treated the organic substances. In doing the latter, he determined how much of the nitrogenous matters belonged to the easily digested albumin and pepton. He lays special stress upon these last, because on them the nutritive value of animal food depends. Two preparations, Carnrick's beef peptonoids and Johnston's fluid beef, contained albuminous substances in the form of fibrin, not soluble in water, of which the value must be determined by artificial digestion, since in this way only can be ascertained what proportion of the fibrin can be digested. He further noted the nitrogen in the shape of flesh bases, kreatin, carnin, etc., since these, with the potash and phosphoric acid associated with them, play an important rôle as food and stimulus for the nervous system.

The flesh extracts of Kemmerich and Liebig are chiefly used for healthy men, but are nevertheless recommended to convalescents to improve digestion and stimulate the circulation, results which are accomplished partly through the abundant flesh bases and partly through the phosphate of potash. This is in accordance with Liebig's own view, which did not claim for his extract any active nutritive power, but recommended it simply as a relish. Kemmerich's flesh extract contains a larger proportion of pepton and albumin, namely, 22 per cent, and he claims correctly for it the properties of a true nutriment, as well as a nervous stimulant.

Murdock's liquid food, which is an extract of beef, mutton, and fruits, made in Boston, is claimed to have 13½ per cent of soluble albumin, which Stutzer has confirmed. The fluid contains 8.3 per cent of alcohol, and on opening the well-sealed vessel the odor was not pleasant, and there seemed to be a partial decomposition of the contents, a tendency to which characterizes albuminous fluids if long kept, especially if they contain fruit juices prone to fermentation.

Valentine's meat juice, made at Richmond, Va., is also a fluid which contains kreatin, potash, and phosphoric acid along with a small quantity of albumin and peptone, and 59 per cent of water.

Johnston's fluid beef, made in Canada, belongs, on account of its containing peptons and digestible albumen, to the better extracts, although the proportion of water is large, being 50 per cent. Stutzer found still more water, nearly 90 per cent, in Benger's peptonized beef jelly and Brand's essence of beef, of which the first is made in Manchester, England, the second in London.

The fluid meat—peptonized meat—of Savory & Moore possesses, according to Stutzer, very different properties. It contains chlorides in considerable amount, and is apparently made with hydrochloric acid in order to peptonize the meat, the acid being neutralized with sodium carbonate. In this method of peptonizing, with the aid of acids, Stutzer considers that the action proceeds too far and that the pepton resolves itself into substances the nature of which is not precisely determined, but which probably do not possess the same nutritive value as pepton.

Essentially different from any of the above is the preparation known as beef peptonoids, made by Reed & Carnrick, of New York. It is a very fine, dry powder, made of beef, gluten of wheat, and condensed milk, a mixture, therefore, of nitrogenous matters of animal and vegetable origin, and is easy of digestion. The gluten is carefully separated from other organic matters of wheat and contains only 1.25 per cent of starch, and 0.25 per cent of cellulose.

The determination of the nutritive value of these preparations can best be made by comparing the easily digestible albumin and pepton in the different preparations. In such a mode of comparison, the most nutritious will be found to be Reed & Carnrick's beef peptonoids, of which 100 parts by weight contained the same amount of albumin and pepton as 178 parts of Johnston's fluid beef, 285 of Kemmerich's flesh extract, 482 of Murdock's liquid food, 745 of Brand & Co.'s essence of beef, 764 of Savory & Moore's fluid meat, 898 of Liebig's flesh extract, 902 of Benger's peptonized beef jelly, and 966 of Valentine's meat juice.

Reed & Carnrick's preparation contains, in addition to the nitrogenous matter, 10.67 per cent of fat, and 10.02 per cent of soluble non-nitrogenous matters in the shape of dextrin and sugar.

In the comparison, says Stutzer, Liebig's extract takes a subordinate position, because it is found to be only an appetizing, and not a nutritious substance. If, on the other hand, the comparison is made as regards the flesh bases contained in them, it is found that 100 parts by weight of Lie-

big's extract contain the same amount of nitrogen in the form of kreatin and carnin as 126 of Kemmerich's meat extract, 537 of Valentine's meat juice, 558 of Johnston's fluid beef, 1844 of Benger's peptonized beef jelly, 4161 of Murdock's liquid food, 5053 of Brand's essence of beef, and 7782 of Reed & Carnrick's beef peptonoids.—*Medical News.*

The Determination of Ethyl Nitrite in Spirit of Nitrous Ether and Kindred Preparations.

(Continued from p. 138.)

WHEN strictly accurate results are not required, the volume of gas need not be corrected for variations of pressure, temperature and tension of aqueous vapor, and if these considerations be omitted the calculation is much simplified. Thus, if 0.030 Gm. of nitric oxide (representing 0.075 Gm. of $C_2H_5NO_2$) under the *ordinary* conditions of pressure and temperature be taken to measure 23.55 C.c., then the

Volume of gas in C.c. × 0.3185

divided by the

Measure of sample in C.c. × density of sample equals the percentage, by weight, of $C_2H_5NO_2$

If the density of the sample be omitted from the equation, the result will be the number of grammes of ethyl nitrite per 100 C.c. of the sample. The nitrometer method has been proved to give very good results with pure sodium nitrite (prepared from silver nitrite) employed in like amount. The results with spirit of nitrous ether are somewhat higher than those given by Eykman's method, the difference being least when sodium chloride is employed in the latter process, and time given for the ferrous solution to react thoroughly on the solution of ethyl nitrite. The results by the iodide method are almost certainly more accurate than those by Eykman's process. With most specimens of sweet spirit of nitre, a considerable amount of nitric oxide is produced (and iodine liberated) before adding the acid, the reaction probably depending on the presence of free acid in the sample. The results obtained in the nitrometer are remarkably constant, and the method furnishes a very easy means of assaying sweet spirit of nitre with considerable accuracy, which is further increased if a correction of 1.5 C.c. (= 0.0048 gramme of $C_2H_5NO_2$) be made for solubility of the gas. The process has the advantage of great ease and rapidity, and actually measures the nitrous compounds present in the sample, instead of leaving their proportions to be inferred from a more or less complex reaction, such as the reduction of permanganate, etc. The following results were obtained by me from six typical samples. No correction was made for pressure or solubility, the figures representing the actual volumes of gas measured at about 15° C.

	Volume of NO from 5 C.c.	Weight of NO from 5 C.c.	$C_2H_5NO_2$.
	C.c.	Milligrammes.	Per cent.
1. 25 p. c. sol. in absolute alcohol (2 mos. old).	(290 from 0.5 C.c.)	923.6	22.02
2. Spt. nitrous ether B. P. (2 months old).	39.4	50.4	2.98
3. Spt. nitrous ether B. P. (age unknown).	27.0	34.6	2.63
4. Spt. nitrous ether B. P. (age unknown).	34.8	44.3	2.62
5. "Spt. ether nit. .850" (new).....	14.7	18.8	1.10
6. Sp. "æther nit dulc. .900" (new).....	22.0	28.2	1.56

No. 1 sample was prepared by Mr. J. Williams, by dissolving one part by weight of carefully purified ethyl nitrite in three parts by weight of absolute alcohol. The density was .8387. With corrections for solubility, pressure, and temperature, the ethyl nitrite shown by the process in this specimen came to nearly 24 per cent. As the sample at the time of examination had a sensibly acid reaction, indicating slight decomposition, I believe the corrected result to express with considerable accuracy the actual composition of the sample. Another solution of ethyl nitrite in absolute alcohol which I have had for upwards of seven years still contains a notable quantity of nitrous ether.

No. 2 sample was the ordinary commercial B. P. article, prepared by Messrs. Rimmington & Son, of Bradford. It gave 1 per cent of ethereal layer by the chloride of calcium test.

Nos. 5 and 6 were analyzed immediately on opening the bottles, as freshly sent out by the wholesale house, which is one of the first reputation. I have analyzed them again, after an interval of a month, and find that 5 C.c. yielded respectively 14.4 and 22.3 C.c. of nitric oxide, measured at the ordinary temperature of the laboratory. Hence they were practically unchanged, though kept in a warm room. I have also employed the process for the assay of a considerable number of other commercial samples, and it has given me every satisfaction.

The nitrometers commonly sold are furnished with three-way taps, but for the purpose in question this is unnecessary, an ordinary tap being sufficient. A nitrometer tube which I have had made for me holds 50 C.c. The cup is narrow and cylindrical, and has marks at 5 and 10 C.c. above the tap. This arrangement renders the use of a pipette or other separate measuring arrangement unnecessary, as the cup can be filled to the 5 C.c. mark with the sample, and thus a definite amount taken for the analysis.*

With the aid of such a nitrometer, the assay of the spirit of nitrous ether for ethyl nitrite and other nitrous compounds, is reduced to an operation of the utmost simplicity, and literally does not require more than ten minutes for its completion, including the necessary calculation. The results are as constant as can be desired, and the process as near an approach to accuracy as is required for ordinary purposes. I believe it will afford the pharmacist or medical man a valuable means of assaying his sweet spirit of nitre, requiring, as it does, no out-of-the-way reagents or even a standard solution.†

In the course of the experiments made in testing the foregoing process, in many instances I observed the amount of nitric oxide set free simply by agitation with iodide of potassium without any acid being added. It might be supposed that the gas given off at this stage of the process was that derived from the free nitrous acid of the sample; but I do not think this is strictly the case, as in experiments in which acetic acid was substituted for dilute sulphuric acid, nearly, if not quite, the whole procurable gas was evolved. Hence a sample which, by decomposition, contained free acetic acid, would evolve nitric oxide, though no nitrous compound other than ethyl nitrite was present.

With regard to Dott's titration process, if the treatment with potassium iodide be effected in an open basin in presence of air, the amount of nitrite found is liable to be seriously in error; but if air be excluded, Dott's method gives fair approximate results, somewhat in excess of the truth. The process can be advantageously employed on the solution which has already been decomposed with potassium iodide in the nitrometer. The nitric oxide is allowed to escape into the air, and the brown liquid is washed into a basin, and at once titrated with decinormal thiosulphate. 1 C.c. of this solution (containing 24.8 Gm. of crystallized $NA_2S_2O_3$ per liter) will react with the iodine liberated by .0075 Gm. of ethyl nitrite.

The results obtained in this manner show a constant difference of about 0.005 Gm. of nitric oxide above that corresponding to the volume of gas liberated in the nitrometer, the true amount doubtless lying between the two. The difference is most probably due to a small amount of nitric oxide remaining dissolved in the aqueous liquid, which causes the volume of gas to be slightly low, and becoming oxidized to nitrous acid during the subsequent titration, liberates a small additional amount of iodine. This source of error becomes very serious if the bulk of the nitric oxide be not previously removed, as is done in the nitrometer. Thus if an attempt be made to determine ethyl nitrite by adding the sample of spirit to an acidulated solution of potassium iodide contained in an open basin, and immediately titrating with standard thiosulphate, the first result is too low, owing to the nitrous ether requiring a sensible time for its decomposition. In a few minutes this error is more than compensated by the additional amount of iodine set free by the nitrous acid, produced by the action of the air on the nitric oxide formed in the primary reaction, and this liberation of iodine goes on so rapidly that the stirring necessary to mix the standard solution with the liquid in the basin causes the solution again to acquire a yellow tinge which rapidly deepens. If the liquid in the basin be allowed to stand for some time exposed to the air before titrating, as recommended by Dott, the iodine set free often amounts to fully twice the quantity primarily liberated by reaction with the ethyl nitrite present.

I have to thank Messrs. Dott, Dymond, Leech, MacEwan, Rimmington Williams, and others, for information and samples connected with my experiment, and Mr. J. H. Worrall for assistance in the manipulations.—ALFRED H. ALLEN in *Pharm. Journ.*, Feb. 21st, 1885.

* Messrs. Cubley & Preston, of High street, Sheffield, are now prepared to supply these nitrometers to those desirous of employing the process mentioned in the text.

† The use of brine in the nitrometer instead of mercury renders the manipulation more simple, without appreciably affecting the accuracy of the results. The nitrometer itself may be extemporized from an inverted Mohr's burette, to the nose of which a short, wide glass tube has been fitted by means of a perforated cork. The open end of the burette is also fitted with a cork, through which passes a short length of glass tubing which is connected by narrow India-rubber tubing with a wide glass tube or funnel to serve as a reservoir.

Deelina Oil, made by the Dee Oil Company, on the River Dee, in England, was recently spoken of by Dr. John Roberts, of Chester, as a local application in eczema when the acute stage has passed. The surface is to be bathed before the application with warm bran-water or oat-meal water. Its source is not mentioned, but is said to be clean, without odor, does not become rancid, and leaves little or no greasiness after its application.—*Practitioner.*

Polyporus Senex, a gigantic species of agaric found on the coast of Chili, has been used by Grossi as a styptic and to arrest night sweats. For the latter purpose, he combines 3¼ grains of the drug with 15 grains of sodium bicarbonate, 3 oz. of distilled water, and 75 grains of gum arabic, giving a tablespoonful at night.

Munra: A Costarican Drug Reputed to Produce Sterility in Women.

DR. H. POLAKOWSKY is the author of an interesting article (in *Petermann's Mittheilungen aus J. Perthes' Geograph. Anstalt*, 1885, 214) on the latest explorations of certain remote territories in Costarica, made by Dr. Thiele.* One portion of this paper, which is of interest medicinally, is given here in translation:

"Second journey to Talamanca, September and October, 1882. The bishop this time went by the way of Limon up to the mouth of, and then up the Sixsaula river, passing by the way of San José de Cabecar and Uruchico ('Oruchika on Gabb and Petermann's map of Costarica'), in a north-eastern direction, until he reached the small settlement Estrella, whence he descended by boat to the Atlantic Ocean, and returned to Limon. During this journey the dialects of Cabecar and Estrella were studied, and some 700 Indians were baptized. One of the caziques of the Cabecar Indians made an attempt to poison the bishop and some of his companions, which resulted, however, only in the death of a Baruka Indian. During this journey the bishop was accompanied by a Swedish zoologist, professor at the University of Upsala, who made valuable collections. . . . In a letter addressed to Dr. Polakowsky by Bishop Thiele (dated from San José, December 14th, 1883), the latter writes as follows:

"'The Indians have great respect for me, and willingly give me all information, though they refuse it to others. Inclosed I send you a great rarity. The Indians of the Talamanca possess a powder which causes sterility in women. It is owing to the use of this powder that these tribes have become so much reduced in numbers. Young and vigorous women often have no children at all, while others have six or eight. Upon investigation, I discovered the reason. Dr. Gabb had also heard of this powder, but could not obtain any of it from the Indians. During my last visit, the cazique gave me a small quantity of it. In order to learn whether it was the genuine article, I showed it on various occasions to different Indians, and all attested its genuineness. Regarding its source, they stated without exception that it is obtained from the fruit of a shrub which is only found along the steep banks of the river of Terraba ("Rio Grande de Terraba" of the charts). The Indians approach the places in canoes and pull the shrubs down with long hooks. Three species of this shrub are distinguished by the Indians. One is called *munra betsei* (yellow munra); this is inert. Another is *munra dorona* (red munra), likewise inert. And the third is *munra tsetsei* (green munra), which is the kind possessing the above-named effect. [Perhaps it is the same plant or fruit, at different stages of development or at different seasons?] Dr. Polakowsky assumes that these colors do not refer to the plant or its flower, but to its product, the powder. During my next journey I will collect the fruits, leaves, etc., of this shrub for you.'

"Unfortunately, the bishop has been prevented from keeping this promise by the sudden interruption of his career. Concerning the powder (the author continues), it is called *munra* by the Indians. The sample sent me by Dr. Thiele consisted of a greenish-gray powder, without odor or taste, crepitant like sand, of a resinous appearance, which was only partly soluble in alcohol, but almost completely in dilute potassa solution. I think it is a resinous exudation found upon the fruits or stems of a plant. The alcoholic solution, when evaporated, yielded a residue, which when examined under the microscope, was found to consist of [to contain?] shining, white, needle-shaped crystals. Unfortunately, the quantity received was too small to hand it over to a chemist. The sample received bore the label 'munra tsetsei.'

Being asked by the author to send him a larger sample, Dr. Thiele wrote to him from San José (under date of April 10th, 1884) as follows: "Concerning the *munra tsetsei*, I shall today write to the cazique of the Talamancas to send me a sufficient quantity. I shall receive an answer in two months, since only one messenger is dispatched each month. I shall also inform him of my wishes respecting samples of the plant, fruit, etc. We must exercise patience, however, since the Indians made only one journey, during the year, to Terraba and Boruca, for the purpose of fetching the munra tsetsei, about which there is otherwise much secrecy observed. Nevertheless, I shall eventually manage to procure it."

[We are pretty sure that the alleged specific action of this drug will turn out, when examined, to be either altogether imaginary, or that it will at least only be an abortifacient, of which there is already a considerable number known. Its value, therefore, will probably be but of a negative character. Were it at all likely that the drug possessed the effect attributed to it, it would have been better had no information concerning it ever been furnished outside of the tribes at present using it.—ED. AM. DRUGG.]

* Dr. Bernhard August Thiele was born April 1st, 1850, at Elberfeld, Germany, was ordained priest at Paris in 1874, and Bishop of Costarica in 1880. On July 18th, 1884, he was expelled from the country by order of the government because he protested against the establishment of public schools without obligatory religious instruction.

A new Test for Sugar in Urine.

GROCCO recommends the following: Pour 40 parts of the urine on a mixture of 2 parts of phenylhydrazin and 3 parts of acetate of sodium, heat in a water-bath during 20 minutes, let settle for half an hour, and examine the sediment under the microscope. If grape-sugar was present, fine yellow crystals of phenylglycosazon will be formed, which are easily detected in dilute solutions. The reaction is said to be reliable, and not disturbed by other constituents of the urine.—*Anali di Chim.—Arch. d. Pharm.*

Hydriodate of Hyoscine.

THIS is a recent addition to the list of chemicals manufactured by E. Merck. It is a very energetic mydriatic which is said to have the advantage that its effects pass away very rapidly. But it is so expensive (1 Gm. about $7.30 at the manufacturer's) that it is not likely to be much used. It is prepared, by a very circuitous process, from the amorphous hyoscyamine, and appears in form of yellowish crystals, easily soluble in alcohol, less so in water. Its composition is $C_{17}H_{21}NO_3$. HI. $\frac{1}{2}$ aq.

Tinning Boilers.

THE boiler to be tinned is first thoroughly freed from oxide, and scoured perfectly bright. It is now coated with a solution of chloride of tin (stannous chloride) containing about 10 per cent of the salt, to which a small quantity of pure cream of tartar had been added. The wet surface is next rubbed with coarsely powdered zinc, such as is obtained by powdering zinc at the moment of its congelation after melting. (The ordinary zinc powder or dust of the market answers equally well.) This method may be used upon brass, cast and wrought iron, and steel. The coating of tin is quite thin, but a thicker coat may be produced by repeating the process. The surface is finally washed and then polished in the usual manner (with chalk, etc.).—*O. W.* in *Pharm. Zeit.*

QUERIES & ANSWERS.

Queries for which answers are desired, must be received by the 5th of the month, and must in every case be accompanied by the name and address of the writer. Unless special instructions to the contrary accompany the query, the initials of the correspondent will be quoted at the head of each answer.

When asking for information respecting an unusual or proprietary compound, always accompany the query with all the information you may possess respecting it, and, when it can conveniently be done, send a specimen of the label.

No. 1,536.—**Jeannel's Multiple Antidote** (B. B. B.).

This is prepared as follows:

	Parts.
Sulphate of Iron, cryst	139
Sodium Sulphide, cryst	110
Calcined Magnesia	29
Distilled Water	710

Dissolve the sulphate of iron in 110 parts of distilled water, with the aid of a gentle heat, and the crystallized sulphide of sodium in 600 parts of the distilled water. With the latter mix the calcined magnesia intimately, and then add the solution of iron to the mixture. There will be produced sulphide of iron (no free ferrous sulphate or alkaline sulphide should remain behind), sulphate of sodium, a little sulphate of magnesium and oxide of iron, together with a large excess of magnesia. We have, therefore, in this case, three powerful antidotes combined, namely, sulphide of iron (which acts as a reducing agent), oxide of iron and magnesia, besides two purgative salts, sulphate of sodium and of magnesium. The compound must be kept from contact with air. It is given in large doses in all cases of poisoning by metallic agents, hydrocyanic acid, cyanides, etc.

On the other hand, it is *inert* in the case of arsenical or alkaloidal poisoning. (After *Formulaire pharm. des hôp. mil.*)

No. 1,537.—**Analysis of Iron Ore** (F. J. P.).

This correspondent thinks he has discovered a source of wealth in a supposed inexhaustible supply of iron upon ground belonging to him. He has made several cursory analyses of the ore, determining the latter by titration with permanganate, but finds that his results differ, probably because he has not succeeded in getting all the iron in solution.

It would be impossible here to give a long and elaborate description of the methods of iron-ore analysis, for which we must refer our correspondent to the works of Fresenius and others. But there has recently been published a paper by Walther Hempel which contains important improvements not yet mentioned in those works. This improvement facilitates the complete solution of the iron ore greatly, and will be of use to quite a number of our readers.

It is well known that, when ores containing ferrous iron are ignited or roasted, by themselves, in contact with the air, *ferric* oxide is never produced, but only the intermediate ferroso-ferric oxide, differing somewhat according to the temperature used. At very high temperatures, ferric oxide even loses some oxygen, and is reduced to the intermediate stage.

The behavior of the oxide is, however, entirely different when lime is present. In this case, *ferric oxide* alone is obtained, and any silicates present are at the same time decomposed. Still better is a mixture of lime and a little carbonate of sodium. In place of lime, magnesia may also be used.

Iron ores ignited in this way may be dissolved with the greatest ease, inside of a few minutes, in hydrochloric acid. The *modus operandi* is as follows:

About 0.3 Gm. of an air-dry sample of the very finely powdered ore is intimately mixed, in an agate mortar, with about 0.4 Gm. of soda (free from iron), and then with about 2 Gm. of precipitated calcium carbonate (also free from iron). The mixture is put in a platinum crucible and ignited with free access of air. On cooling, the cake may be easily removed, with a glass or porcelain spatula, to a wide-necked flask, any still adhering fragments dissolved with strong hydrochloric acid and added to the contents of the flask, which are then dissolved by boiling a few minutes.

For further details, which are of less interest to the general reader, we refer to the original, *Ber. Deutsch. Chem. Ges.*, 1885, 1130.

No. 1,538.—**Transparent Cement for Porcelain** (J. S.).

A formula recently recommended in the *Polyt. Notizbl.* is as follows:

Dissolve 75 parts of cut caoutchouc in 60 parts of chloroform, add 15 parts of mastic and macerate in the cold, until the whole is dissolved.

No. 1,539. — **Toilet and Medicated Soaps** (N. V.).

As a rule, it will be found most economical to purchase such soaps from the manufacturer, or to get him to prepare them after a given recipe, rather than to attempt their preparation on a small scale. Nevertheless, we will give a few formulæ, taken from a series published some time ago in the *Seifenfabrikant* which are quite easy of execution:

1. *Transparent Soap with Glycerin.*

Tallow (free from acids).	37	parts.
Butter or Lard	37	"
Cocoanut Oil	16	"
Talc	4	"
Soda Lye, 30° B	45	"
Glycerin	13	"

Mix the talc with the oil previously heated. When the temperature is at 113° F., the lye is added and thoroughly stirred so that a soap is formed. Cocoa-nut oil is usually saponified at a comparatively low temperature, because (unless first-class Cochin cocoanut oil is used) the resulting soap would acquire a disagreeable odor by heating.

The soap is scented by adding to every 5 pounds of it 8 grammes of the following mixture:

Oil of Bergamot	130	parts.
" " Portugal	70	"
" " Bitter Almonds	30	"
" " Vetiver	5	"

It may be colored with uranium orange. When completely set, it is cut into suitable pieces, or may be pressed in moulds.

2. *Transparent Soap without Glycerin.*

Cocoa-nut Oil (Cochin).	100	parts.
Tallow	120	"
Castor Oil	70	"
Soda Lye, 36° B.	156	"
Sugar	40	"
Water	50	"
Alcohol, 96%	80	"

Melt the oil, strain it through a cloth, cool to 167°–176° F., and then add the lye. When the soap is formed, add the sugar dissolved in water, at a temperature of 130° F., and afterwards the alcohol. Now add a "filling" prepared from

Sugar	12	parts.
Common Salt	12	"
Potash	12	"
Water	40	"

very slowly, and, taking care that no turbidity is produced in the soap, allow to cool to about 113° F., perfume and pour into moulds.

3. *Another, without Glycerin.*

Cocoa-nut Oil (Cochin).	50	parts.
Stearin	31	"
Castor Oil	12½	"
Soda Lye, 35° B.	78	"
Sugar	80	"
Water	60	"
Alcohol, 90%	52	"
Resin (bright-yellow, "French")	20	"

The oil, stearin, lye and sugar solution are combined as before; the alcohol is then added, and heat applied. When the temperature has reached about 180° F., the heat is withdrawn, and the resin added in fine powder. The mixture is once more heated, short of boiling. Finally, the soap is allowed to stand quietly for half an hour, then strained and perfumed with oil of geranium, or other oils.

No. 1,540.—**The Unit of Value of Cinchona Barks** (M.).

Cinchona bark is always bought and sold on the basis of its richness in quinine, which is determined by assay. The seller, whether a private dealer or agent for foreign planters or for government, has careful assays made of the different lots, which are of course almost in all cases verified or controlled by assays made on behalf of the intended buyer or bidder. When the sale is about to take place, supposing it to be an auction, each bidder knows what amount of quinine he can expect to extract from a particular lot of bark—and some, who have special advantages in skill, experience, and apparatus—may even know beforehand that they will get more valuable products out of the bark than the assay of the seller's chemist would have justified them to expect. They are, therefore, prepared to give a little more, per pound, than some of the other bidders. The purchases are made at so much (in London, shillings and pence) per pound.

When we hear of 1*s.* 6*d.*, or 2*s.* 3*d.*, or 2*s.* 9*d.*, or 3*s.* 10*d.*, etc., being paid for bark, this does not convey to us any intelligence whether the higher or lower price is due to speculation, or to the ratio between supply and demand, or to the richness of the bark. In order to establish a trustworthy and uniform measure by which the fluctuations of the bark market may be followed, a conventional *unit* has been established, which is the resultant between a known value—the percentage of quinine — and a variable value, namely, the general condition of the market. To state it briefly:

The unit of the value of Cinchona barks is the amount paid for the quinine contained in 70 grains of the bark, or, in other words, for the quinine contained in 1 per cent of a pound (7000) grains of bark.

This unit being known, the pound price of bark is found by merely multiplying it with 10.

In England, the unit is expressed in *pence*,

If the unit is, for instance, 3*d.*, the bark should cost 30*d.*, or 2*s.* and 6*d.* per pound. If it is 5*d.*, 1 pound of bark costs 50*d.*, or 4*s.* and 2*d.*, etc.

No. 1,541.—**Liquid Shoe Dressing** (L. P. K.).

It is impossible for us to insure that the product prepared after any formula given by us will be identical with or "equal to" that put on the market by a special manufacturer, who keeps his process secret. As a rule, if anyone discovers an excellent working formula for a salable preparation, he tries to make money out of it, and instead of publishing its mode of preparation, he keeps it as secret as possible. Only in exceptional cases do these really good formulæ leak out.

This is more especially the case with products of a technical character, many of which it is difficult or altogether impossible to analyze.

Having premised these remarks, we append two formulæ, which we must leave to our correspondent to try:

Borax	2 oz.
Shellac, in powder	6 oz.
Water	2½ pints

Dissolve the shellac in the borax and water, by heating a few hours on the water bath. When cold, strain. In order to render it more pliable, add a little glycerin.

It may be colored *black* by nigrosine; *red*, by eosin or fuchsin; *blue*, by some of the aniline blues (methyl-blue); *green* by malachite, or methyl-green; *violet* by methyl-violet, etc.

Or it may be colored black by logwood ink.

The following is also taken from our files:

Glue, 4 oz.; logwood chips, 8 oz.; powdered indigo, 2 drachms; potassium bichromate, 4 drachms; tragacanth, 4 drachms; glycerin, 4 oz.; water (soft), 1 pint; vinegar, 2 pints. Macerate the logwood chips with the vinegar in a closed vessel for several days, then heat to near boiling and strain. Soak the glue in one-half of the water, then melt it, add the glycerin, and the finely-powdered indigo. Dissolve the bichromate of potassium in the remainder of the water and add it to the logwood-vinegar. Raise this to boiling, add the glue solution, avoiding the access of daylight. Then strain and transfer the product to bottles of dark amber glass. When this "dressing" is applied to any surface, and the latter exposed to daylight, the bichromate and gelatin will make an insoluble compound.

No. 1,542.—**Linaloe** (W. H. R.).

An essential oil of linaloe was first offered in the London market in 1865, but the importers, as Mr. Piesse relates in his work on the "Art of Perfumery," were unwilling to give any information about it. This at first caused doubts as to its being a genuine production. Mr. Piesse's extremely well-trained powers of scent, however, convinced him that it was a natural production. Owing to meeting the word *lignaloe* in the Scriptures, he supposed it might be identical with the odoriferous wood mentioned there; but as the true Biblical lignaloe is from *Aquilaria Agallocha* of South-eastern Asia, and the new linaloe was asserted by the the importers (Messrs. Sargent & Co.) to come from Mexico, the latter necessarily was derived from another source. Samples of the wood were then procured from Vera Cruz, and being submitted to the authorities at Kew Gardens, were quickly pronounced to be the *Bois de Citron du Mexique* [or *Bois de Rose femelle*], so named by Guibourt, but which in Mexico is known by the name of linaloe.

The essential oil of linaloe is perfectly white in color; it appears to be very unalterable by the action of air; and it is here that it differs so much from any of the citron group of odors, but to which it nevertheless belongs by fragrance. It so much resembles the sweet odor of the lime-tree flowers that, when properly diluted with alcohol, and with the addition of a little oil of rose, it makes an excellent imitation perfume of lime blossoms (*Piesse*).

Collins, in 1869, examined the wood, and published a paper on the subject in the *Pharm. Journ.* (April, 1869). He referred, in his paper, to an account of the substance given in a Mexican treatise on the native materia medica, where it is supposed to be derived from some species of *Amyris*. It is now known to be derived from *Amyris Linaloe* La Llave (= *Elaphrium aloëxylon* Sch.), a tree belonging to the natural family Terebinthaceæ, and growing in the hot valleys of the western slopes of the Cordilleras

of Mexico. A fine exhibit of this "bois de rose" was displayed at the Centennial Exhibition, in 1876, by Mr. Delpech, of Cuantla, Morelos, Mexico.

As the Mexican pamphlet above mentioned is quite rare (its title is: *Ensayo para la Materia Medica Mexicana, arreglado por una comision . . . de esta Capital* . . . Sm. 4to. Puebla, 1832), we will translate the article referring to linaloe from the copy in our possession:

Lignoaloe or *Linuanué* (*Amyris*).

Is produced abundantly in the Misteca and the vicinity of Matamoros. From the information which could be collected, and some seeds that were received, the plant probably belongs to the genus *Amyris*. Its wood is light, of a yellowish color, with more or less darker yellow veins through the interior, of a very aromatic odor, especially when rasped or reduced to shavings, the odor resembling that of rhodium, for which it is often substituted in the drug-stores. Its essential oil has a rather agreeable odor, and for this reason it is used in perfumery.

No. 1,543.—**Kola Nuts** (F.).

Kola nuts may be obtained from any of the large wholesale houses in New York City. They are quoted at about $2 per pound, but might probably be obtained much cheaper in quantities. A fluid extract is not yet quoted on the price-lists we have lately consulted, but it will be an easy matter for you to prepare one yourself.

No. 1,544.—**Pao Pereiro** (D. D. S.).

In reply to the query of this correspondent, we can do no better than to quote the following from Thos. Christy's *New Commercial Plants and Drugs*, No. 7 (1884), page 66:

The *Pao Pereiro* (*Geissospermum lævе* Baillon: nat. ord. *Apocynaceæ*) is a native of Brazil, and the bark of the tree has been extensively used by physicians in that country since it was first introduced to the notice of the medical profession in 1830, by Prof. Silva, as a valuable febrifuge and antiperiodic, and is still in great favor with Brazilian physicians. The bark is also known under the name of *Pignaciba* and *Canudo amargoso*. The active principle of the bark was first extracted by Santos in 1838, and was called by him *pereirine*. More recently, however, M.M. Rochefontaine and De Freitas have proposed the name of *geissospermine* for it. This alkaloid is contained also in the leaves in less quantity. It produces poisonous effects when given to small animals, two milligrammes causing the death of a frog, a centigramme similarly affecting a full-grown guinea pig, and fourteen centigrammes completely paralyzing a small dog. The symptoms produced were a slackening of the cardiac beats, and of the respiratory movements. The voluntary movements were first paralyzed, then the reflex movements. The sensitive nerves remain unaffected as long as the motor nerves and the muscular contractility are not affected. It is therefore supposed that geissospermine acts by destroying the physiological properties of the central nervous gray matter. Dr. O. Hesse, who has further examined the bark, found at least two alkaloids in the bark, one of which is very easily soluble in ether, and corresponds best with the alkaloid first obtained, for which he retains the name of pereirine; and the other with difficulty soluble in ether, and to which he gives the name of geissospermine. Pereirine is a white amorphous powder, and appears to be the most abundant alkaloid in the bark. It is colored red by strong nitric acid, and violet-red by pure sulphuric acid. Geissospermine forms small white prismatic crystals, truncated at both ends, is readily soluble in alcohol, but nearly insoluble in water and in ether. It is freely soluble also in acids; if reprecipitated from such solutions by ammonium or sodium hydrate, the precipitate, at first flocculent, speedily becoming crystalline. Strong nitric acid dissolves geissospermine with a purple-red color, which remains for some time at the ordinary temperature, but, if heated, the color immediately disappears, passing into orange-yellow. Pure concentrated sulphuric acid dissolves it without coloration, but after a few seconds the solution becomes bluish, afterwards blue, and at last again pale.

No. 1,545.—**Gelatin Bougies** (Monad).

We do no know the mode of preparation of the special gelatin bougies mentioned by you. But we can tell you, in a general way, how medicated gelatin bougies are made.

Gelatin, best white	3 parts
Water, cold	1 part
Glycerin	6 parts

Soak the gelatin in the cold water; when it is entirely soft, add the glycerin and melt the whole together. Any medicinal ingredient to be added may either be dissolved in the water before the gelatin is soaked in it; or, if it is not readily soluble, it may be incorporated with the glycerin; or, it may be added to the finished mass before it sets. A series of glass tubes are kept on hand, of an internal diameter of about three to six millimeters, or of such a diameter as has been demanded for the bougies, the interior of the tubes is oiled by passing a pellet of oily cotton through it, and the tubes, which must be previously heated, are then filled by suction. It is not so convenient to fill them by pouring the mass in above, as it is apt to be full of air-holes. A small piece of rubber, with a pinch-cock, may be attached to the upper end, so that when the tube is full the pinch-cock may compress the tube, and the contents will not sink back when the mouth is removed from the orifice. The tubes are then removed, the point of the finger being first pushed under the lower orifice, the latter is stoppered, and they are then set aside to cool. When cold, they may easily be pushed out by means of a rod, best preceded by a pellet of cotton, so as to fill out the calibre of the tube. The bougie is then cut into suitable lengths.

Hager gives the following proportions:

Gelatin	1 or 3 parts
Water	1 " 2 "
Glycerin	6 " 21 "

The proportion of glycerin, however, is here much too large to produce bougies of sufficient elasticity.

No. 1,546.—**Bromo-Chloralum** (U.S.)

We find the following formula on our files:

Alum, in coarse powder	2 pounds
Boiling water	4 pints
Water of ammonia	q. s.
Hydrochloric acid, common	q. s.
Bromine	1 oz.
Water	q. s.

Dissolve the alum in the boiling water. Add 5 gallons of cold water, and mix well; then precipitate with water of ammonia, until a slight excess of free ammonia is present in the liquid. Allow to settle, pour off the supernatant solution of sulphates of ammonium, etc., and wash the precipitate twice with cold water by decantation. Then transfer the precipitate to a muslin strainer, allow to drain, transfer it to a suitable vessel, add the bromine, and cover it air-tight. Afterwards add enough hydrochloric acid, in small quantities at a time, to dissolve the precipitate, and then enough water to make the product measure 1 gallon. Finally filter.

No. 1,547.—**Micro-chemistry and Micro-botany** (L. and others).

Besides Wormley's Treatise on Micro-chemistry, just issued in second edition, there is no work known to us which is specially devoted to the study of the behavior of chemical substances towards tests or towards solvents under the microscope. There are, however, numerous works in which fragmentary portions of this field of study are treated, not to mention general works on the microscope (see below), some of which devote more or less space to it.

The only other work specially devoted to a *similar* subject is the little treatise of Poulsen on Botanical Microchemistry (translated from the Danish, published by Cassel & Co., Boston), which does not, however, confine itself to the reactions of chemical individuals, but teaches the method of identifying or separating structural elements in plants by means of reagents.

To a small extent this field is treated by other works, but by none so thoroughly as by this.

Among works on "Micro-botany," to use this term, there is a large selection possible.

While nothing can adequately replace oral and practical instruction by a competent teacher, in the use of the microscope, in making sections, in mounting, etc., it is nevertheless possible to acquire a good deal of knowledge and experience by self-instruction. For those who have to depend upon this, the best work is probably the following:

Strassburger, Dr. Ed. Das kleine botanische Practicum für Anfänger. Anleitung zum Sebst-Studium der mikroskopischen Botanik, etc. 8vo. Jena, 1884. [This book should find an English translator.]

Another good aid is:

Behrens, W. Hilfsbuch zur Ausführung mikroskopischer Untersuchungen im botanischen Laboratorium. 8vo. Braunschweig, 1884.

In addition to these the following may be studied:

Flückiger, F. A. Grundlagen zur pharmaceutischen Waarenkunde. 8vo. Berlin, 1873.

Wiesner, Dr. J. Die Rohstoffe des Pflanzenreichs. 8vo. Leipz., 1873.

Wiesner, Dr. J. Elemente der wissenschaftlichen Botanik. I. and II. 8vo. Wien, 1881, 1884.

Vogl, Dr. Aug. Arzneikörper aus den drei Naturreichen in pharmakognostischer Hinsicht. 8vo., Wien, 1880. (The introduction is specially valuable.)

Oldberg and Wall. Companion to the U. S. Pharm. 8vo. N. Y., 1884. (Appendix.)

Berg's Atlas zur pharmaceutischen Waarenkunde. 8vo. Berlin, 1865.

Prof. J. M. Maisch is also expected soon to publish a work covering the same ground.

Of special works on the microscope, treating of its application to botany, we might mention the following out of a large number:

Carpenter, W. B. The Microscope and its Revelations. 6th ed. Sm. 8vo. Phila., 1881.

Wythe, J. H. The Microscopist. 8vo. Phila., 1880.

Beale, L. S. How to work with the Microscope. 5th ed. 8vo. London, 1880.

Hogg, Jabez. The Microscope. Sm. 8vo. London, 1883.

Formulæ Wanted.—Some of our correspondents make inquiries after the following:

Formula of a mucilage like that sold in bottles, one for taffy tolu, and another for spruce gum (for chewing).

CORRESPONDENCE.

The Source of Todd's Pipmenthol.

DEAR SIR:—Noticing with interest the articles in your journal relating to pipmenthol and menthol, their derivation, manufacture, etc., I shall take pleasure, at an early day, in giving your readers some facts which will, I trust, satisfactorily settle some controverted points, and perhaps throw some light on other questions that as yet are a subject of popular inquiry only. For lack of time, I can hardly do more at present than to settle the discussion as to the variety of plant from which I produce my peppermint crystals—pipmenthol. I had indeed supposed that the public mind was set right in the matter, until my attention was called to the article "Source of Todd's Menthol" in the AMERICAN DRUGGIST, June, 1885, p. 115. Unfortunately, I had not observed the query on "peppermint" (No. 1,450, p. 77, AM. DRUGGIST for April), which called forth this inquiry, or I should promptly have corrected a statement so misleading.

In the query referred to, Mr. Christy says: "We have furnished Mr. A. M. Todd with his stock of plants."

The facts are as follows: After having discovered and commenced the manufacture of pipmenthol, I learned from Mr. Thos. Christy that he had Japanese menthol plants for sale, and being unable to supply pipmenthol in as great quantity as was demanded, and thinking it might be profitable to make japmenthol also, I promptly cabled to him for all his plants, also for a shipment of "white Mitcham" and "black Mitcham" peppermint, as I wished to determine their comparative value on American soil. Unfortunately, the plants proved a failure, and I have not a dozen of either variety from my investment, which was, I think, over three thousand plants. As I reported the facts to Mr. Christy last summer and fall, I was much surprised to see the statement referred to, for I have not had sufficient Japanese plants yet to produce an ounce of menthol, nor even to determine their value by experimental distillation.

The variety of plants which I have exclusively used is the true peppermint, *Mentha piperita*, which is the variety we grow in America for the essential oil of peppermint.

This plant is more robust in its growth than either of the English varieties, as I observed them growing in the mint fields of Mitcham, England, in July, 1875. It differs from them in these respects: it is in both leaf and stem of lighter color than the "black Mitcham," and of somewhat darker color than the white Mitcham. The stems of the black are a dark purple, and the deep-colored veins of the leaves give them also a purple hue. The "white" has a green stem and leaf. There is not sufficient difference, however, in the general structure of the plants, in the opinion of E. M. Holmes, to entitle the "white" and "black" to distinctive botanical names. Our American variety has a light purple stem, but no purple in the leaf, so in color it might be called a blending of the "black" and "white," but, as already observed, it is more robust in growth than either of the others. It is said that there are two varieties of the Japanese menthol plant (Mentha arvensis) growing in Japan, distinguished by a dark and light color, as in England, and that the former grows in the north and is more preferable.

To determine the facts in this case, and to test the comparative value of each variety in manufacturing and for cultivation, I have ordered direct shipments from Japan, and shall also have more English plants. I shall, after giving each variety a like soil and like conditions, carefully note their distinctive traits and characteristics, determine their comparative value, and, if possible, their relationship, and will find pleasure in giving your readers such facts as seem worthy of public interest. Meantime I remain, yours most respectfully, A. M. TODD.

NOTTAWA, ST. JOSEPH'S CO., MICH., June 22d, 1885.

Hospital Stewards in the Army.

Editor American Druggist.

SIR:—In your issue of June appears a letter signed "Hospital Steward, U.S.A.," that does harm to the cause that he represents, by inviting the antagonism of other branches of the army, and which conveys to people unfamiliar with military usages, exceedingly erroneous ideas. I am in full accord with any efforts tending to the increase of the pay and allowances of non-commissioned officers, hospital stewards included, coincident with an increase of efficiency, but I do not think that the statements made by your correspondent are likely to aid the movement desired.

Referring in detail to his complaints, the social status of hospital stewards is regulated partly by the necessities arising from the peculiar conditions under which soldiers live, and partly in accordance with general customs. The social relations of the families of officers and enlisted men, with a few exceptions, are about what they would be in civil life. An officer cannot associate on familiar terms with enlisted men, whatever may be their merits, without damage to discipline, nor can the ladies of his family meet on equal terms the wives of the men under his command without affecting him. That the wives and daughters of hospital stewards are "often classed with washerwomen and servants of the officers" is true, since the wife is usually hospital matron, whose official duties are limited to washing the hospital linen. Your correspondent regards this view as unjust, but admits in his closing paragraph that this is really their position. The statement of authorized allowances is approximately correct, but a steward usually gets far more than he can legally claim. It may be that at some posts his one room is "with the Post-Surgeon's stables," but that it is in very close connection therewith may be doubted. Ninety-nine times out of a hundred he has as many stoves as he needs; the hospital allowance of fuel is so liberal that he can burn all that necessity or inclination may require, and his allowance of clothing is greater than that of the private soldier.

As to being ordered "to button up his blouse," which he seems to regard as an insult, the order was certainly legal, and probably commendable. An undershirt, or even white shirt, displayed through an unbuttoned blouse, a garment intended to be worn buttoned, presents a slovenly and unmilitary appearance, and is not tolerated in other enlisted men on military duty, or while passing an officer. The rank of the officer who gave this order, his qualifications, and his parentage had better not been introduced. The legality or manner of giving an order may be questioned in a proper way, but nothing justifies abuse of the authority from whom it issued.

Nor is the advancement of the hospital stewards to be obtained by belittling the importance of other non-commissioned staff positions. The Commissary Sergeant is a "grocery clerk," but he is a clerk who is practically in charge of a large amount of valuable property of a character that may be easily damaged, or more or less readily made away with, unless constant care be exercised. It is true that his duties are not onerous, and that with honesty and sobriety, a quite moderate degree of intelligence will enable him to accomplish them satisfactorily, but as a rule he does far more work than a steward. The Quartermaster Sergeant, who "bosses the mules and wagons of his department," does not do this except indirectly, and does have many things to look after. At a small post, a non-commissioned officer of the line is in charge of stables; at large posts a civilian wagon master. The Q. M. Sergt. receives and compares with the invoices all stores received at the post (original packages are not opened), is responsible to his immediate superior that all issues are properly made, and that the whereabouts of every non-expendable article is known. He makes out, often personally, and is held responsible by the Q.M., for the accuracy of the multiple reports and returns of the department. He is supposed to, and usually does, keep track of the orders constantly being issued that modify existing regulations affecting his department. In the same way that your correspondent claims to be responsible for property, the Q.M. Sergt. is responsible for one hundred to ten thousand times as much. Although not material to the issue, both Q. M. and Com. Sergeants are usually old soldiers, the value of whose services to the U. S. has been proven by years of trial.

The clerical duties of a hospital steward, at ordinary posts, with the exception of a few minutes' daily work on the morning report, and the copying for transmission and record of the official letters of the medical officers, occupy about three days at the end of each month, an additional day at the end of a quarter, and perhaps a week at the end of the year. Stewards are not responsible for property, except as every soldier is for articles intrusted to him. The legally responsible party is the Post Surgeon. He has charged against his pay the value of articles lost or destroyed, for which he cannot render a satisfactory explanation. A steward can only be held pecuniarily responsible after trial and sentence by a General Court Martial. To avoid this, he may make good, shortages in property that has been under his immediate supervision, but he cannot be compelled to do it.

The compensation of a steward is not measured by his pay proper. Besides this, which is for a first enlistment $30 a month, he receives his food, lodging, furniture, clothing, lamps and oil, fuel, and to a certain extent attendance, since the hospital nurses or fatigue parties do such work as cutting and carrying his wood and bringing water. If he be married, his wife is usually appointed hospital matron, if she desires the position, and receives for washing the hospital bedding and towels $10 a month and a ration. It is safe to say that a married steward receives treble the allowance of rooms, fuel, etc., to which he is entitled.

In conclusion, there are abundant reasons to be offered why an intelligent and deserving class of non-commissioned officers should receive increased pay. Misleading statements and unfounded claims in public prints may do irretrievable damage to their hopes, and a just cause needs no such bolstering.

ARMY.

The New Belgian Pharmacopœia has just been issued. It forms a stout volume of 800 pages. The text is in Latin and French. It will go into official use on September 1st, 1885.

BIBLIOGRAPHY.

THE MEDICAL DIRECTORY OF PHILADELPHIA, Pennsylvania, Delaware, and the Southern Half of New Jersey. 1885. Philadelphia: P. Blakiston, Son & Co. Pp. 397. Morocco, Gilt Edges, $2.50.

THIS work has been considerably increased in its scope since last year, and is now the handsomest and most comprehensive directory to physicians, pharmacists, and dentists with which we are acquainted. Its contents embrace pretty much everything that can be expected in a medical directory, and its seal-skin, flexible covers, edges gilded on a red ground, and clean typography, make it a pleasing object for the office table.

CHOLERA: Its History, Cause, and Prevention. By EZRA A. BARTLETT, M.D. Albany, N. Y.: H. H. Bender Pp. 105. Small 8vo. $0.30.

THIS is a very well-arranged and clearly-written popular manual upon the subject of Cholera, which treats of the History of Cholera, its Cause, Propagation and Prevention, and the Hygiene of Food and Drink, and Disinfection. Its size permits of the book being carried in the pocket, and we recommend it for popular sale by druggists, as something that will be in demand this summer.

PROCEEDINGS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, at Thirty-second Annual Meeting, held at Milwaukee, Wis., August, 1884; also the Constitution, By-laws, and Roll of Members, Philadelphia; 1885. Pp. 623, 174, 84.

BESIDES the contents indicated in the title, this volume has a portrait of Daniel B. Smith and a General Index of Volumes XVIII. to XXX. of this series, most admirably compiled by that painstaking man, Hans M. Wilder. This last feature alone fills 194 pages, and should, with the preceding General Index, be in the hands of every working pharmacist.

BABYHOOD is a new monthly magazine, of 32 pages, edited by LEROY MILTON YALE, M.D., and MARION HARLAND; the former editing the medical department, the latter supervising the departments relating to general nursery routine. It is issued by the Babyhood Publishing Co., of 18 Spruce street, New York, for $0.15 a number, or $1.50 a year. It is very admirably adapted for the dissemination of knowledge relating to the physical, mental, and moral well-being of infancy.

HAY-FEVER and its Successful Treatment, etc. By CHARLES E. SAJOUS, M.D., etc. Philadelphia: F. A. Davis, Att'y. 1885. Pp. 103.

THIS is the text of an essay read before the Philadelphia Laryngological Society in April, 1884. The writer's opinion of the cause of the disease coincides with that of previous writers, inasmuch as he believes that a hereditary or acquired predisposition, with pathological changes in the mucous membrane of the nasal cavity, and the existence of a special, existing cause are all factors in producing the paroxysm; and that it is necessary to remove only one of these three conditions to prevent attacks. The greater portion of the work is, therefore, devoted to methods of relieving the pathological state of the nasal cavity. It is clearly written, well illustrated, and handsomely published, but lacks both table of contents and index.

UNIVERSAL-PHARMAKOPÖE. Eine vergleichende Zusammenstellung der zur Zeit in Europa und Nordamerika gültigen Pharmakopöen. Von DR. BRUNO HIRSCH. 4te Lieferung, 1885.

WE have already in our last volume (page 178) drawn attention to this important publication, and have allowed several numbers to pass by before coming back to the subject, since we desired to have a larger selection of interesting matter to choose from, so that our readers might convince themselves of the importance of this publication. We have reason to know that the author expected the whole work to be passed through the press as rapidly as possible. Whatever delay there may have been, must be the publisher's fault. As it is, we could almost wish that the author had been able to make use of the new British and Belgian pharmacopœias, which are expected to be out in a few weeks. The Spanish pharmacopœia has also appeared in a new edition since the author's work was begun to be printed, but there is so little evidence of progress visible in the new revision that the existence of the new pharmacopœia, outside of Spain, has scarcely been noticed or alluded to in the pharmaceutical literature. We have no doubt that the author will give, in an appendix, a summary of the contents of the several new pharmacopœias.

We have made a translation of several of the more important articles contained in the last-published number, which will be found in this issue of our journal.

The work will be completed in about 15 numbers, at 2 marks each.

"Give me some soda-powders, please, and let me have some which do not effervesce so boisterously, as I am very nervous."—*Fliegende Blätter.*

AN OUTLINE OF A COURSE OF STUDY IN PRACTICAL PHARMACY. By OSCAR OLDBERG, Phar.D., Professor of the Theory and Practice of Pharmacy, and Director of the Pharm. Laboratory at the Chicago College of Pharmacy. *Intended as a Guide for Students.* 8vo. (Published by the author.) Chicago, 1885 (pp. 104).

THIS "outline" offers a most excellent framework around which not only the didactic lectures may be grouped and constructed, but which will also be found a very serviceable guide for self-study, repetition, and self-examination. The author did not confine himself to theoretical or operative pharmacy exclusively, but also trends upon chemistry and materia medica, rightly believing that certain features of these disciplines must be drawn into the course on pharmacy.

We have no doubt that this outline will be of great value to all students of pharmacy, whether they are pupils of Prof. Oldberg or not, since the subjects treated of must be studied by them some time or another, though the order in which they are lectured upon in other schools may differ from that adopted by Prof. Oldberg.

MITTHEILUNGEN DER K. K. CHEMISCH-PHYSIOLOGISCHEN VERSUCHSSTATION FUER WEIN- UND OBSTBAU in Klosterneuberg bei Wien. Von PROF. DR. L. ROESLER. Vol. IV. Pp. 52, 4to, with 48 tables.

THIS report contains the results of analyses of a large number of wines by Dr. Roesler, B. Haas, and L. Weigert, as well as descriptions of the methods and apparatus employed.

DRUGGISTS' AND TRAVELERS' POCKET PRICE BOOK. Pp. 287.

THIS is a book having titles on the margin of the left hand page, and the remainder of both opposite pages ruled in 14 columns for prices of various invoices or for making inventories. There is also a marginal alphabetical index. The book seems to have been made so decidedly for the benefit of the purchaser that the maker has forgotten his own interest in it, so that the title-page has no indication of where or by whom it is made, or of its price.

SUPPLEMENT TO THE TRANSACTIONS OF THE SEI I. KWAI, or Society for the Advancement of Medical Science in Japan. Tokio. Foreign Subscription, $2.00.

ITEMS.

Fruit of the Calabash Tree (*Cressentia Cujete* Lin.).—The pulp and expressed juice are both employed in Brazil as a purgative. A grain and a half of the alcoholic extract acts as a laxative, and seven grains or more as a drastic. The fresh pulp is also employed locally in erysipelas. It is first boiled with water to a black paste, vinegar is then added, and it is boiled again. It is applied on linen.—*N. Y. Med. Jour.* from *Nouveaux remèdes.*

Paraldehyde. — Mr. Hodgson has used this drug as a hypnotic in insomnia unattended with pain, in mania, hypochondriasis, delirium tremens, and migraine. Compared with chloral, it has the advantage of not being a cardiac depressant. He recommends it also for both acute and chronic gout, but finds it unsuitable, on account of its pungency, in inflammations of the throat or stomach. This quality always renders free dilution necessary. It is weak as an anodyne, but heightens the effect of morphia.—*Br. Med. Jour.*

Anagyrine is the alkaloid extracted by Hardy and Gallois from *Anagyris fœtida* and *A. indica.* According to the former, small doses act as a tonic, but large doses cause the death of small animals by arresting respiration.

Basis for Ointments and Suppositories.—The seeds of *Hopea splendida, H. aspera,* and some other species are said to furnish a fatty matter known in the Sunda Islands as *myniak tangkawank* or *myniak sangkawank,* which is used for various purposes, and seems likely to be of value pharmaceutically.